Service Manual for Volumetric Infusion Pump

ARGUS 707 V

Made in Switzerland

CE 0120

ARGUS MEDICAL

ARGUS Medical AG, CH-3627 Heimberg / Switzerland
(a member of the CODAN group)

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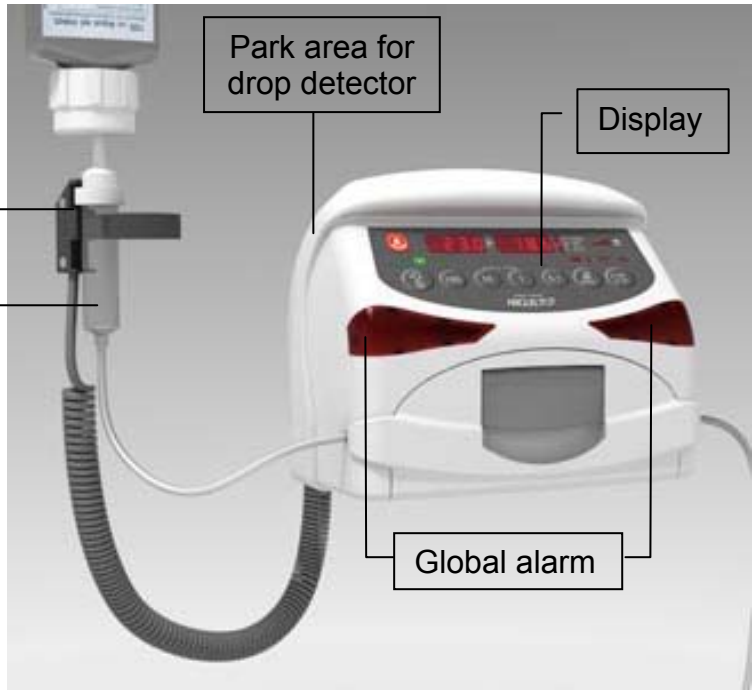
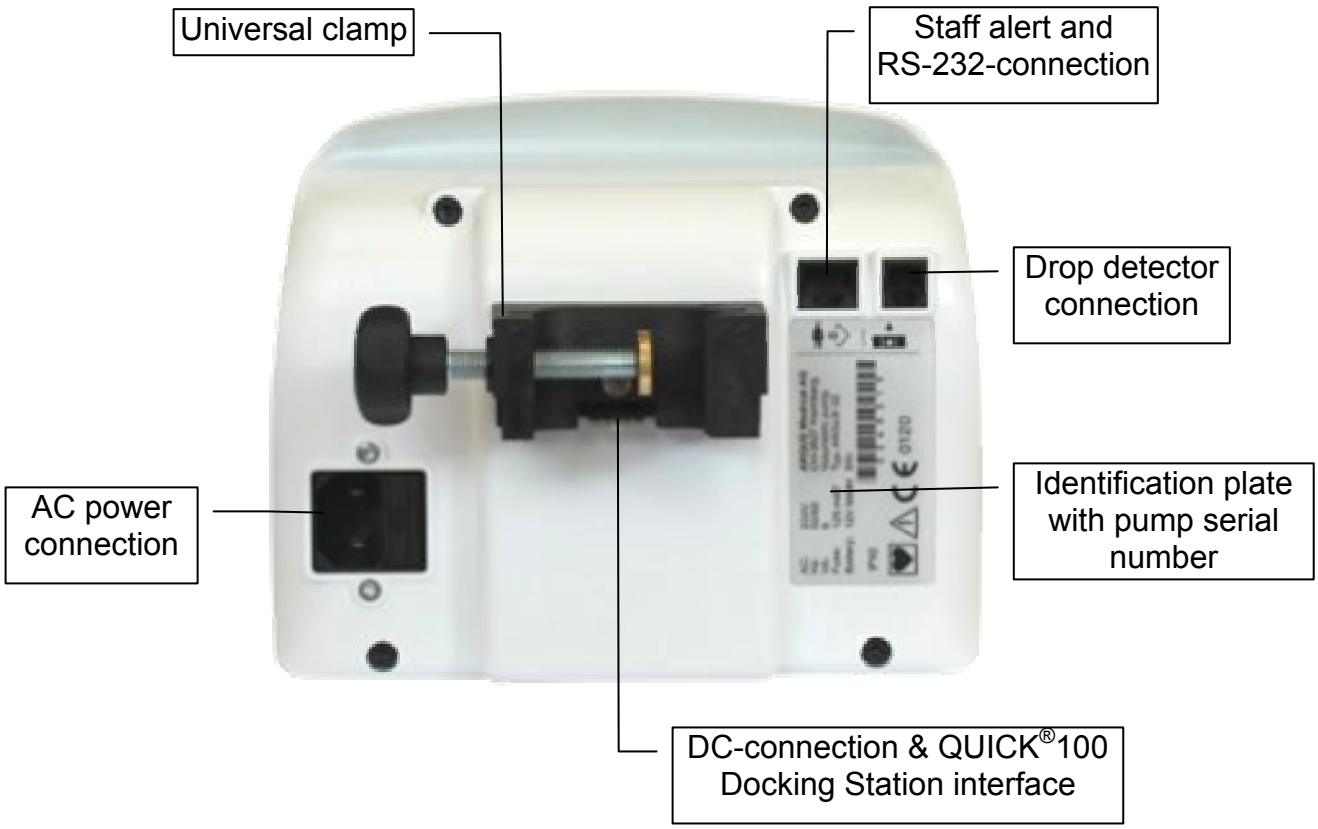

Park area for drop detector
Display
Drop detector
Drop chamber
Global alarm

ARGUS 707
Air bubble detector
Pressure sensor „upstream“
automatic „free-flow“-clamp
Pressure sensor „downstream“


Universal clamp
Staff alert and RS-232-connection
Drop detector connection
AC power connection
Identification plate with pump serial number
DC-connection & QUICK®100 Docking Station interface

1. INTRODUCTION

1.1. General

IMPORTANT!
This service manual is intended for the exclusive use of authorized persons who have been trained by ARGUS Medical AG in the maintenance and repair of the ARGUS 707 V infusion pump.
The service manual is meant to be used together with the user manual.

IMPORTANT!
ARGUS Medical AG shall not assume any responsibility for any manipulations which have been carried out on the ARGUS 707 V infusion pump by a non-authorized person.

CAUTION!
The ARGUS 707 V infusion pump may only be used with spare parts, accessories, consumables and IV-sets with Luer-Lock connections recommended by ARGUS Medical AG. The functional safety of the pump is not guaranteed if non approved materials are used. The safety of the patient may be endangered.

This manual contains the latest data available. It is subject to further modifications in accordance with technical improvements.

2. PUMP CONFIGURATIONS

2.1. General

CAUTION!
The configuration possibilities with the “ARGUS *service*” PC utility tool and without PC assistance constitute a modification of the pump and may only be carried out by authorized persons!

CAUTION!
After changing the configuration a function check and a control measurement has to be performed!

2.2. Interrogation mode (without ARGUS *service*)

With the interrogation mode you can read the present keypad configuration of the pump without the possibility to modify any configurations. For a complete overview, please take the "ARGUS *service*" PC-tool!

1. To enter into the interrogation mode, switch the pump on while keeping the keys "MODE" and "START/STOP" pressed.

2. Press the "START/ STOP" key.

3. Enter the requested address *(see chapter 2.6)*, e.g. 5. The programmed value of the address 5 appears in the right hand display.

4. To quit the interrogation mode press the "ON/OFF" key at least 2 seconds.

Flashing decimal points indicate which display is ready to accept an input by the keys 100, 10 & 1.

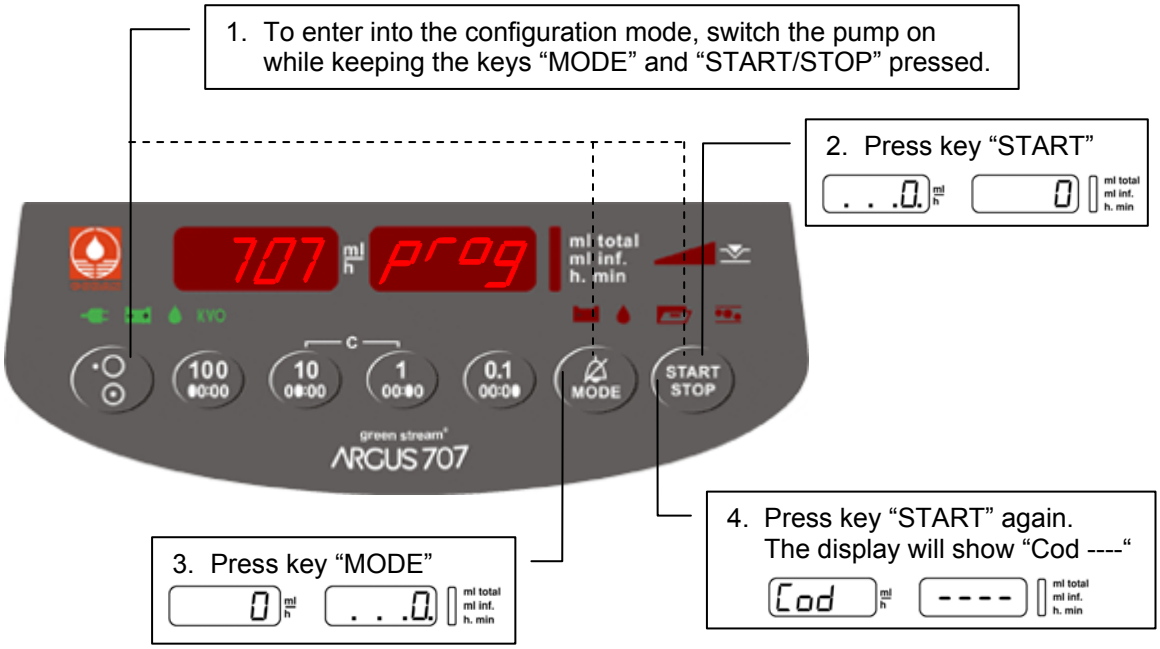
In the interrogation mode the left hand display shows the address and the right hand display shows the according value configured at this address. Please refer to *chapter 2.6.* where the meanings of the addresses are explained.

To modify any configuration data you have to go into the configuration mode.

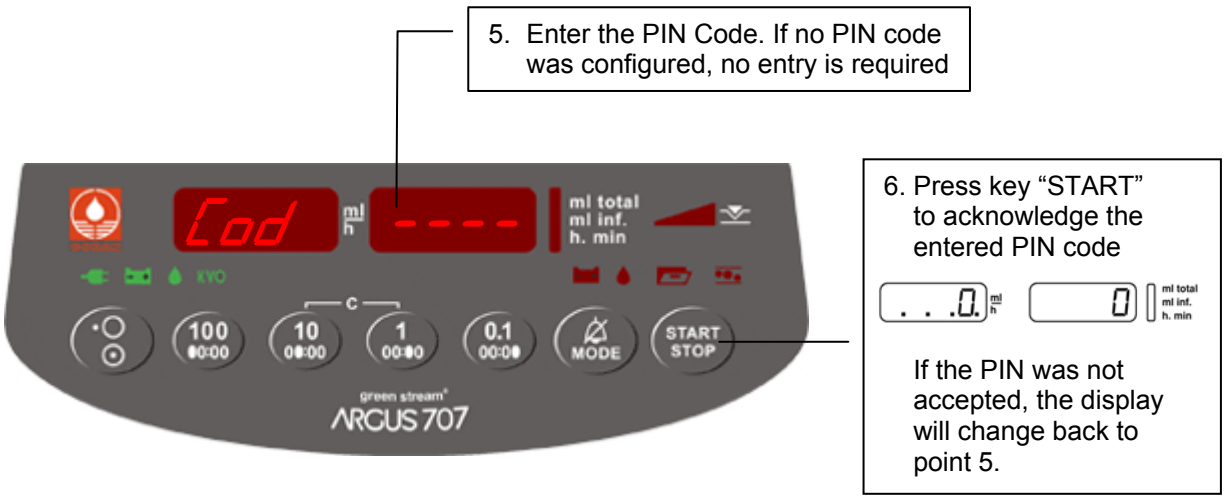
2.3. Configuration mode (without ARGUS *service*)

The configuration mode permit you to modify the pump keypad configuration manually using the keypad. Please refer to *chapter 2.6.* where the meaning of the adresses are explained. To have access to all configuration options, please use the "ARGUS *service*" PC-tool!

2.3.1. Step 1



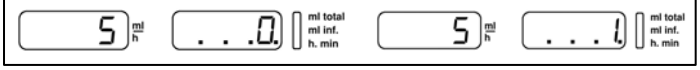
2.3.2. Step 2



You have now access to all addresses in the list of *chapter 2.6.*
Select therefore any address in the left display *(see next page)*.

2.3.3. Step 3

8. Enter now the value on the right hand display. The range of the value is given by the table in *chap.2.6*



7. After entering an address e.g. 5 press the key “MODE”. The flashing decimal points will change to the right hand display.

9. Press key “START” to acknowledge the value entered. The flashing decimal points change back to the left hand display.

10. To quit the configuration mode press the “ON/OFF” key at least 2 seconds. Changes in configuration become active, after the pump is switched on normally again.

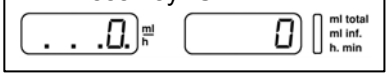
Important remark:
Invalid values entered will be corrected automatically by the pump to the maxima or minima value allowed for the according address!

2.4. First activation of a PIN code (write protection)

The activation of a PIN code allows you to protect the configuration from unauthorized access. To activate the PIN code, **enter into the configuration mode.**

1. To enter into the configuration mode, switch the pump on while keeping the keys “MODE” and “START/STOP” pressed.

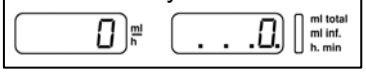
2. Press key “START”

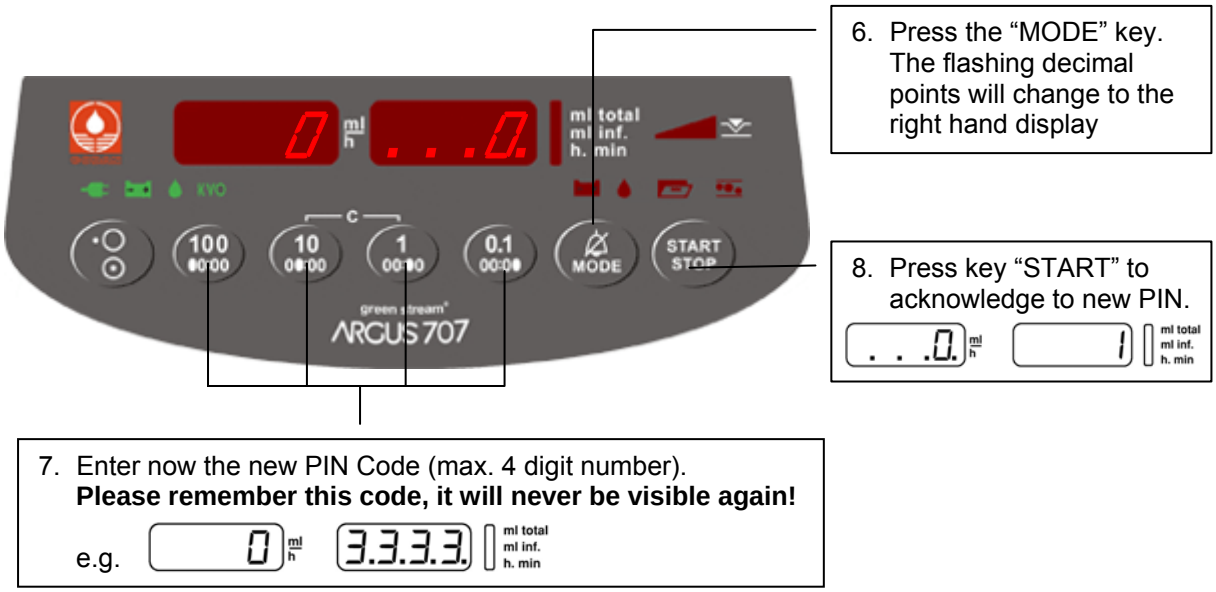


4. Press key “START” again. The display will show “Cod ----“.

5. Press “MODE” key (Code “0” will be set) then “START” key to acknowledge the entered PIN code “0”.

3. Press key “MODE”



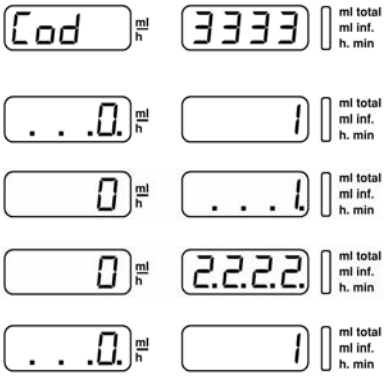


CAUTION!
After you switch the pump OFF and ON again you can enter into the configuration mode only, if you enter the correct PIN code.

Please note: The interrogation mode can always be accessed without the PIN.

2.5. Changing an existing PIN code

Enter the configuration mode using present PIN, select add. “0” and set the new code.


Cod
3333
Enter actual PIN code and confirm with “START” key.
Press “MODE” key (#0). The flashing decimal points will change to the right hand display.
Enter the new PIN code and press the “START/STOP” key to acknowledge the entered code.
ml total
ml inf.
h. min

2.6. Address list of the pump configuration (without ARGUS *service*)

The following list declares the possible configuration options which can be performed on the pump keypad without using the PC.
All these options can also be configured by the PC-Software “ARGUS *service*”.

Address left display	Index PC	Default	Function	Unit	Range right display
1	2	No	Key ON/OFF only at stop valid	-	0=No / 1=Yes
2	10	No	Operation without drop detector	-	0=No / 1=Yes
3	11	No	Recall of the last used ml/h rate	-	0=No / 1=Yes
4	19	No	Buzzer at start	-	0=No / 1=Yes
5	44	Yes	Automatic pressure release	-	0=No / 1=Yes
6	49	No	Alarm acknowledge with key MODE	-	0=No / 1=Yes
100	361	5	Key ON/OFF delay time	• 0.1 s	0 - 31
101	362	8	Display brightness	level	2 - 15
102	363	7	Buzzer volume	level	5 - 10
103	316	9	Default pressure limit (IV-set 1)	• 100 mbar	1 - 10
104	318	20	Drop rate window centre (IV-set 1)	Drops/ml	10 - 65
200	317	250	Air bubble size (IV-set 1)	µl	50 - 1000
399	-	707	Enter the calibration menu (volume)	-	123
	-	707	Enter the calibration menu (pressure)	-	1234

Note!
The address does not correspond with the index used by the “ARGUS *service*” tool.

2.7. Index list of the pump configuration (with ARGUS *service*)

Index PC	Add.	Default	Function		Unit	Range
1		Yes	Run indication by running decimal point		-	No / Yes
2	1	No	Key ON/OFF only at stop valid		-	No / Yes
3		No	Rate change allowed only at STOP		-	No / Yes
4		No	Key STOP delayed	# 361	-	No / Yes
5		No	Second entry of rate	# 3=Yes	-	No / Yes
6		No	Static alarm (staff alerting system)		-	No / Yes
7		No	Display elapsed time in run mode	# 8=No	-	No / Yes
8		No	Display remaining time	# 7=Yes	-	No / Yes
9						
10	2	No	Operation without drop detector		-	No / Yes
11	3	Yes	Recall of ml/h rate at next power on		-	No / Yes
12		No	Recall of ml total at next power on		-	No / Yes
13		No	Recall of ml inf. at next power on		-	No / Yes
14		No	SBS (step by step function)		-	No / Yes
15		No	Display VTBI (volume to be infused)		-	No / Yes
16		No	Display “Set-X” if only one set is enabled		-	No / Yes
17		Yes	KVO (KOR) enabled	# 60	-	No / Yes
18		No	Drop alarm only if bottle empty	# 10=No, → trA	-	No / Yes
19	4	No	Buzzer at start		-	No / Yes
20		No	Menu Clr (clear ml inf.)	# 15=No	-	No / Yes
21						
22		No	Menu trA (transport)	# 10, 18=No	-	No / Yes
23		Yes	Menu PrL (pressure alarm limit)		-	No / Yes
24		Yes	Menu CAP (battery capacity)		-	No / Yes
25		No	Menu SEt Fill (prime IV set)			
26		No	Menu InF (ml inf. since last power on)		-	No / Yes
27		No	Menu dLo (data lock)		-	No / Yes
28		No	Menu Stb (stand by)		-	No / Yes
29		No	Menu Med (medication name)		-	No / Yes
30		No	Menu tM (timer alarm)		-	No / Yes
31						
32		No	Menu boL (bolus release)		-	No / Yes
33		No	Menu boLr (bolus rate)	# 32=Yes	-	No / Yes
34		No	Menu tot (bolus total)	# 32=Yes	-	No / Yes
35						
36						
37						
38		No	Automatic bolus application	# 32, 34=Yes	-	No / Yes
39		No	Neonatology mode accessible in PrL menu		-	No / Yes
40						
41		No	Clear ml/h after infusion completed		-	No / Yes
42		No	Clear ml total after infusion completed	# 41=Yes	-	No / Yes
43		No	Air volume accumulated		-	No / Yes
44	5	Yes	Automatic pressure release after occlusion		-	No / Yes
45		Yes	Pressure display ON (LED bar graph - 20/40/60/80/100%)		-	No / Yes
46		No	Pressure display with indicator	# 45=Yes	-	No / Yes
47		No	Stand by- and battery pre alarm low volume		-	No / Yes
48		No	Flashing numeric display at alarm		-	No / Yes
49	6	No	Alarm acknowledge only with key MODE		-	No / Yes

50		No	Start with ≥ 1 bar pressure allowed		-	No / Yes
51		Yes	Enable upstream occlusion detection		-	No / Yes
52						
53						
54						
55		No	Select RJ-45 connector for serial interface		-	No / Yes
56		Yes	Medication display alternate	# 29=Yes	-	No / Yes
60		No	KVO only after infusion completed		-	No / Yes
65		No	Clear and continue	# 15=No	-	No / Yes
101		Yes	Set 1 enabled		-	No / Yes
102		No	Set 2 enabled		-	No / Yes
103		No	Set 3 enabled		-	No / Yes
104		No	Set 4 enabled		-	No / Yes
105		No	Automatic return on default set 1 after power up	# 101=Yes	-	No / Yes
201		1065	Correction at 1 ml/h	**SET 1** Do not change these values unless explicitly trained	ratio	900 - 1100
202		1054	Correction at 3 ml/h		ratio	900 - 1100
203		1044	Correction at 5 ml/h		ratio	900 - 1100
204		1035	Correction at 10 ml/h		ratio	900 - 1100
205		1027	Correction at 25 ml/h		ratio	900 - 1100
206		1020	Correction at 50 ml/h		ratio	900 - 1100
207		1014	Correction at 75 ml/h		ratio	900 - 1100
208		1008	Correction at 100 ml/h		ratio	900 - 1100
209		999	Correction at 150 ml/h		ratio	900 -1100
210		988	Correction at 200 ml/h		ratio	900 - 1100
211		976	Correction at 250 ml/h		ratio	900 - 1100
212		967	Correction at 300 ml/h		ratio	900 - 1100
213		952	Correction at 400 ml/h		ratio	900 - 1100
214		942	Correction at 500 ml/h		ratio	900 - 1100
215		925	Correction at 750 ml/h		ratio	900 - 1100
216		910	Correction at 999 ml/h		ratio	900 - 1100
217		1000	Correction at 1200 ml/h		ratio	1000-1100
221		1065	Correction at 1 ml/h	**SET 2** Do not change these values unless explicitly trained	ratio	900 - 1100
222		1054	Correction at 3 ml/h		ratio	900 - 1100
223		1044	Correction at 5 ml/h		ratio	900 - 1100
224		1035	Correction at 10 ml/h		ratio	900 - 1100
225		1027	Correction at 25 ml/h		ratio	900 - 1100
226		1020	Correction at 50 ml/h		ratio	900 - 1100
227		1014	Correction at 75 ml/h		ratio	900 - 1100
228		1008	Correction at 100 ml/h		ratio	900 - 1100
229		999	Correction at 150 ml/h		ratio	900 -1100
230		988	Correction at 200 ml/h		ratio	900 - 1100
231		976	Correction at 250 ml/h		ratio	900 - 1100
232		967	Correction at 300 ml/h		ratio	900 - 1100
233		952	Correction at 400 ml/h		ratio	900 - 1100
234		942	Correction at 500 ml/h		ratio	900 - 1100
235		925	Correction at 750 ml/h		ratio	900 - 1100
236		910	Correction at 999 ml/h		ratio	900 - 1100
237		1000	Correction at 1200 ml/h		ratio	1000-1100

238						
239						
240						
241		1065	Correction at 1 ml/h	**SET 3** Do not change these values unless explicitly trained	ratio	900 - 1100
242		1054	Correction at 3 ml/h		ratio	900 - 1100
243		1044	Correction at 5 ml/h		ratio	900 - 1100
244		1035	Correction at 10 ml/h		ratio	900 - 1100
245		1027	Correction at 25 ml/h		ratio	900 - 1100
246		1020	Correction at 50 ml/h		ratio	900 - 1100
247		1014	Correction at 75 ml/h		ratio	900 - 1100
248		1008	Correction at 100 ml/h		ratio	900 - 1100
249		999	Correction at 150 ml/h		ratio	900 - 1100
250		988	Correction at 200 ml/h		ratio	900 - 1100
251		976	Correction at 250 ml/h		ratio	900 - 1100
252		967	Correction at 300 ml/h		ratio	900 - 1100
253		952	Correction at 400 ml/h		ratio	900 - 1100
254		942	Correction at 500 ml/h		ratio	900 - 1100
255		925	Correction at 750 ml/h		ratio	900 - 1100
256		910	Correction at 999 ml/h		ratio	900 - 1100
257		1000	Correction at 1200 ml/h		ratio	1000-1100
258						
259						
260						
261		1065	Correction at 1 ml/h	**SET 4** Do not change these values unless explicitly trained	ratio	900 - 1100
262		1054	Correction at 3 ml/h		ratio	900 - 1100
263		1044	Correction at 5 ml/h		ratio	900 - 1100
264		1035	Correction at 10 ml/h		ratio	900 - 1100
265		1027	Correction at 25 ml/h		ratio	900 - 1100
266		1020	Correction at 50 ml/h		ratio	900 - 1100
267		1014	Correction at 75 ml/h		ratio	900 - 1100
268		1008	Correction at 100 ml/h		ratio	900 - 1100
269		999	Correction at 150 ml/h		ratio	900 - 1100
270		988	Correction at 200 ml/h		ratio	900 - 1100
271		976	Correction at 250 ml/h		ratio	900 - 1100
272		967	Correction at 300 ml/h		ratio	900 - 1100
273		952	Correction at 400 ml/h		ratio	900 - 1100
274		942	Correction at 500 ml/h		ratio	900 - 1100
275		925	Correction at 750 ml/h		ratio	900 - 1100
276		910	Correction at 999 ml/h		ratio	900 - 1100
277		1000	Correction at 1200 ml/h		ratio	1000-1100
310		999.9	Max. flow rate	**Set 1 parameters**	ml/h	1 - 999.9
311		999	Max. prime rate		ml/h	1 - 999
312		1200	Max. bolus rate		ml/h	1 - 1200
313		10	Max. bolus total		ml	1 - 999
314		10	Upstream occlusion sensitivity		factor	0 - 60
315		20	Air summation volume		• 50 µl	2 - 40
316	103	7	Downstream default pressure limit PrL		• 100 mbar	1 - 10
317	200	250	Air bubble size		µl	50 - 1000
318	104	20	Drop rate window center		drops	10 - 65
319						

320		999.9	Max. flow rate	**Set 2 parameters**	ml/h	1 - 999.9
321		999	Max. prime rate		ml/h	1 - 999
322		1200	Max. bolus rate		ml/h	1 - 1200
323		10	Max. bolus total		ml	1 - 999
324		10	Upstream occlusion sensitivity		factor	0 - 60
325		20	Air summation volume		• 50 µl	2 - 40
326		7	Downstream default pressure limit PrL		• 100 mbar	1 - 10
327		250	Air bubble size		µl	50 - 1000
328		20	Drop rate window center		drops	10 - 65
329						
330		999.9	Max. flow rate	**Set 3 parameters**	ml/h	1 - 999.9
331		999	Max. prime rate		ml/h	1 - 999
332		1200	Max. bolus rate		ml/h	1 - 1200
333		10	Max. bolus total		ml	1 - 999
334		10	Upstream occlusion sensitivity		factor	0 - 60
335		20	Air summation volume		• 50 µl	2 - 40
336		7	Downstream default pressure limit PrL		• 100 mbar	1 - 10
337		250	Air bubble size		µl	50 - 1000
338		20	Drop rate window center		drops	10 - 65
339						
340		999.9	Max. flow rate	**Set 4 parameters**	ml/h	1 - 999.9
341		999	Max. prime rate		ml/h	1 - 999
342		1200	Max. bolus rate		ml/h	1 - 1200
343		10	Max. bolus total		ml	1 - 999
344		10	Upstream occlusion sensitivity		factor	0 - 60
345		20	Air summation volume		• 50 µl	2 - 40
346		7	Downstream default pressure limit PrL		• 100 mbar	1 - 10
347		250	Air bubble size		µl	50 - 1000
348		20	Drop rate window center		drops	10 - 65
349						
350						
351		4	Air volume summation time		• 8 min	1 - 8
361	100	5	Key ON/OFF delay time	# 4	• 1/10 s	0 - 31
362	101	8	Display brightness		level	2 - 15
363	102	10	Buzzer alarm volume		level	5 - 10
364						
365	103	150	Pressure step for neonatology mode	# 39=Yes	mbar	60 - 250
366		1	Pressure display unit (mbar / mmHg / kPa / cmH2O / Psi)		Enum	1 - 5
367						
368	200	300	Battery capacity (discharge time)		min	45 - 300
369		5	Automatic menu fall back delay time		sec	5 - 30
390		0	Last service date in year		year	0 - 99
391		0	Last service date in month		month	0 - 12
392		0	Last service date in day		day	0 - 31
393		0	Service interval in months	(0 = disabled)	month	0 - 24
394		0	Service interval in hours of operation	(0 = disabled)	hour	0 -10000
395						
396		0	Pump serial number		**xxx** 8 **yyy**	xxx 8 yyy
397						
398						
-	399	707	Enter the calibration menu / clears protection key		-	123/4

518		2	Permissions for serial communication 0 = none, 1 = query only, 2 = parametrising, 3 = remote control	Enum	0 - 3
522		No	Allow change of ml total while infusing # 65=No	-	No / Yes
523		15	Alarm lamp brightness	level	2 - 15
524			Display a department info text (after power up)	char	1-16 ASCII

Using the "ARGUS *service*" tool, the complete and detailed pump configuration can be done.

2.8. Special configuration options (with ARGUS *service*)

Enabling a new IV set
Follow the steps below to enable and configure a new IV set:

a) write "Yes" in the corresponding index 101, 102, 103, 104
b) make sure the set definitions (index 201 to 277) correspond to the IV sets used. In case of doubt, contact ARGUS Medical AG or your local dealer.
c) configure the set parameters (index 310 to 349 and 351)
d) perform a complete set calibration as per *chapters 6.3. to 6.5.*

2.9. Medication list

2.9.1. General

To display medication names, index 29 (menu "MEd") must be set to "Yes". The selected medication name can be displayed also in alternate mode (rate, ml inf./ med. name) during infusion, for that set index 56 to “Yes”.

After enabled special function “Med” the following medication names can be selected via pump keypad (see user manual).

2.9.2. User medication

32 user medication names can be custom defined. Choose between capital and small letters for a better displayed medication name. Because of the 7-segment pump display some characters maybe difficult to read.

Index PC	Default	Function	Unit	Range
561	UserM 1	User med. name 1	char	1 - 8 ASCII
562	UserM 2	User med. name 2	char	1 - 8 ASCII
563	UserM 3	User med. name 3	char	1 - 8 ASCII
564	UserM 4	User med. name 4	char	1 - 8 ASCII
565	UserM 5	User med. name 5	char	1 - 8 ASCII
566	UserM 6	User med. name 6	char	1 - 8 ASCII
567	UserM 7	User med. name 7	char	1 - 8 ASCII
568	UserM 8	User med. name 8	char	1 - 8 ASCII
569	UserM 9	User med. name 9	char	1 - 8 ASCII
570	UserM 10	User med. name 10	char	1 - 8 ASCII
571	UserM 11	User med. name 11	char	1 - 8 ASCII
572	UserM 12	User med. name 12	char	1 - 8 ASCII
573	UserM 13	User med. name 13	char	1 - 8 ASCII
574	UserM 14	User med. name 14	char	1 - 8 ASCII
575	UserM 15	User med. name 15	char	1 - 8 ASCII
576	UserM 16	User med. name 16	char	1 - 8 ASCII
577	UserM 17	User med. name 17	char	1 - 8 ASCII
578	UserM 18	User med. name 18	char	1 - 8 ASCII
579	UserM 19	User med. name 19	char	1 - 8 ASCII
580	UserM 20	User med. name 20	char	1 - 8 ASCII
581	UserM 21	User med. name 21	char	1 - 8 ASCII
582	UserM 22	User med. name 22	char	1 - 8 ASCII
583	UserM 23	User med. name 23	char	1 - 8 ASCII
584	UserM 24	User med. name 24	char	1 - 8 ASCII
585	UserM 25	User med. name 25	char	1 - 8 ASCII
586	UserM 26	User med. name 26	char	1 - 8 ASCII
587	UserM 27	User med. name 27	char	1 - 8 ASCII
588	UserM 28	User med. name 28	char	1 - 8 ASCII
589	UserM 29	User med. name 29	char	1 - 8 ASCII
590	UserM 30	User med. name 30	char	1 - 8 ASCII
591	UserM 31	User med. name 31	char	1 - 8 ASCII
592	UserM 32	User med. name 32	char	1 - 8 ASCII

2.9.3. Defined medication

Index PC	Def.	Function	Range
600	Yes	Enable medication	No / Yes
601	No	Actilyse	No / Yes
602	No	Actrapid	No / Yes
603	No	Adrenaline 0.1	No / Yes
604	No	Adrenaline 0.2	No / Yes
605	No	Adriamycine	No / Yes
606	No	Ajmalin	No / Yes
607	No	Alfentanil	No / Yes
608	No	Alimta	No / Yes
609	No	Alizapride	No / Yes
610	No	Alteplase	No / Yes
611	No	Alupent	No / Yes
612	No	Ambroxol	No / Yes
613	No	Aminophylline	No / Yes
614	No	Amiodaron	No / Yes
615	No	Amphotericine	No / Yes
616	No	Amrinone lactate	No / Yes
617	No	Antibiotic	No / Yes
618	No	Aprotinin	No / Yes
619	No	Arterial line	No / Yes
620	No	Atracurium	No / Yes
621	No	Bleomycine	No / Yes
622	No	Blood	No / Yes
623	No	Bretylium	No / Yes
624	No	Bupivacne	No / Yes
625	No	Capecitabine	No / Yes
626	No	Carboplatin	No / Yes
627	No	Carmustine	No / Yes
628	No	Cefazolin sodium	No / Yes
629	No	Central line	No / Yes
630	No	Ceruletid	No / Yes
631	No	Chlormethine	No / Yes
632	No	Cisplatine	No / Yes
633	No	Cladribine	No / Yes
634	No	Clomethiazol	No / Yes
635	No	Clonidin	No / Yes
636	No	Cyclophosphamide	No / Yes
637	No	Cytarabine	No / Yes
638	No	Dacarbazine	No / Yes
639	No	Dactinomycine essai cliniq.	No / Yes
640	No	Daunorubicine liposomale	No / Yes
641	No	Diltiazem	No / Yes
642	No	Dobutamin	No / Yes
643	No	Docetaxel	No / Yes
644	No	Dopamine	No / Yes
645	No	Dopexamine	No / Yes
646	No	Doxapram hcl	No / Yes
647	No	Doxorubicin	No / Yes
648	No	Droperidol	No / Yes
649	No	Ecteinascidine	No / Yes
650	No	Edrecolomab	No / Yes
651	No	Epidural	No / Yes
652	No	Epirubicine	No / Yes
653	No	Esmolol	No / Yes
654	No	Etoposide	No / Yes
655	No	Fentanyl	No / Yes
656	No	Flecainide	No / Yes
657	No	Fludarabine	No / Yes
658	No	Fluimucil	No / Yes
659	No	Fluorouracil	No / Yes

Index PC	Def.	Function	Range
660	No	Fotemustine	No / Yes
661	No	Furosemid	No / Yes
662	No	Gemcitabine	No / Yes
663	No	Glucose 5%	No / Yes
664	No	Glucose 10%	No / Yes
665	No	Glucose 30%	No / Yes
666	No	Glucose - n/saline	No / Yes
667	No	Glycerin	No / Yes
668	No	Granisetron	No / Yes
669	No	Hartmann`s	No / Yes
670	No	Heparin	No / Yes
671	No	Hydroxycarbamide	No / Yes
672	No	Ifosfamide	No / Yes
673	No	Immunoglobulin	No / Yes
674	No	Insulin	No / Yes
675	No	Irinotecan	No / Yes
676	No	Isoproterenol HCL	No / Yes
677	No	KCL	No / Yes
678	No	Ketamin	No / Yes
679	No	Labetalol	No / Yes
680	No	L-asparaginase	No / Yes
681	No	Lidocain	No / Yes
682	No	Liothyronin	No / Yes
683	No	Lipids	No / Yes
684	No	Lomustine	No / Yes
685	No	Magnesium	No / Yes
686	No	Maintenance line	No / Yes
687	No	Mannitol	No / Yes
688	No	Metaraminol bitartrate	No / Yes
689	No	Methohexital sodium	No / Yes
690	No	Methotrexate	No / Yes
691	No	Methyldopate hcl	No / Yes
692	No	Metoclopramide	No / Yes
693	No	Metopimazine	No / Yes
694	No	Midazolam	No / Yes
695	No	Milrinone	No / Yes
696	No	Mitoguazone	No /Yes
697	No	Mitomycine	No /Yes
698	No	Mitoxantrone	No /Yes
699	No	Mivacurium chloride	No /Yes
700	No	Morphin	No / Yes
701	No	Nacl 0.9%	No / Yes
702	No	Nacl 0.45%	No / Yes
703	No	Nalbuphin	No / Yes
704	No	Naloxone	No / Yes
705	No	Nicardipine	No / Yes
706	No	Nifedipin	No / Yes
707	No	Nimodipin	No / Yes
708	No	Nitroclycerin	No / Yes
709	No	Nitroprussiate	No / Yes
710	No	Noradrenalin	No / Yes
711	No	Norepinephrine bitartrate	No / Yes
712	No	Nutriflex	No / Yes
713	No	Omeprazole	No / Yes
714	No	Omipressin	No / Yes
715	No	Ondansetron	No / Yes
716	No	Oxaliplatine	No / Yes
717	No	Oxytocin	No / Yes
718	No	Paclitaxel	No / Yes
719	No	Pentoxityllin	No / Yes

720	No	Phentolamine	No / Yes
721	No	Phenylephrin	No / Yes
722	No	Pirarubicine	No / Yes
723	No	Plicamycin	No / Yes
724	No	Procainamide	No / Yes
725	No	Procarbazine	No / Yes
726	No	Propafenon	No / Yes
727	No	Propofol	No / Yes
728	No	Prostaglandin e1	No / Yes
729	No	Raltitrexed	No / Yes
730	No	Rapilysin	No / Yes
731	No	Remifentanyl	No / Yes
732	No	Risordan	No / Yes
733	No	Ritodrine hcl	No / Yes
734	No	Rituximab	No / Yes
735	No	Rocuronium bromide	No / Yes
736	No	Ropivacane	No / Yes
737	No	Salbutamol	No / Yes
738	No	Somatostatin	No / Yes
739	No	Streptokinase 36000 ie	No / Yes
740	No	Streptokinase 1000 ie	No / Yes
741	No	Streptokinase 3000 ie	No / Yes
742	No	Streptokinase 6000 ie	No / Yes
743	No	Streptokinase	No / Yes
744	No	Streptozocine	No / Yes
745	No	Succinylcholine chloride	No / Yes
746	No	Sufentanil	No / Yes
747	No	T.P.N	No / Yes
748	No	Tegafur	No / Yes
749	No	Temozolomide	No / Yes
750	No	Terbutaline	No / Yes
751	No	Theopyllin	No / Yes
752	No	Thiotepa	No / Yes
753	No	Tirofiban	No / Yes
754	No	Tolazolin hcl	No / Yes
755	No	Topotecan	No / Yes
756	No	Trastuzumab	No / Yes
757	No	Trimethaphan camsylate	No / Yes
758	No	Umbilical arterial catheter	No / Yes
759	No	Umbilical venous catheter	No / Yes
760	No	Urapidil	No / Yes

761	No	Urokinase	No / Yes
762	No	Vasopressine	No / Yes
763	No	Vecuronium	No / Yes
764	No	Verapamil	No / Yes
765	No	Vinblastine	No / Yes
766	No	Vincristine	No / Yes
767	No	Vindesine	No / Yes
768	No	Vinorelbine	No / Yes
769	No	User defined med. 1	No / Yes
770	No	User defined med. 2	No / Yes
771	No	User defined med. 3	No / Yes
772	No	User defined med. 4	No / Yes
773	No	User defined med. 5	No / Yes
774	No	User defined med. 6	No / Yes
775	No	User defined med. 7	No / Yes
776	No	User defined med. 8	No / Yes
777	No	User defined med. 9	No / Yes
778	No	User defined med. 10	No / Yes
779	No	User defined med. 11	No / Yes
780	No	User defined med. 12	No / Yes
781	No	User defined med. 13	No / Yes
782	No	User defined med. 14	No / Yes
783	No	User defined med. 15	No / Yes
784	No	User defined med. 16	No / Yes
785	No	User defined med. 17	No / Yes
786	No	User defined med. 18	No / Yes
787	No	User defined med. 19	No / Yes
788	No	User defined med. 20	No / Yes
789	No	User defined med. 21	No / Yes
790	No	User defined med. 22	No / Yes
791	No	User defined med. 23	No / Yes
792	No	User defined med. 24	No / Yes
793	No	User defined med. 25	No / Yes
794	No	User defined med. 26	No / Yes
795	No	User defined med. 27	No / Yes
796	No	User defined med. 28	No / Yes
797	No	User defined med. 29	No / Yes
798	No	User defined med. 30	No / Yes
799	No	User defined med. 31	No / Yes
800	No	User defined med. 32	No / Yes

REMARK :
Via barcode reader all medication names can be selected, even if they are not released in the configuration.

3. SERIAL COMMUNICATION OF THE PUMP

3.1. General

The ARGUS 708 Volumetric pump has two serial interfaces on board. One is wired to the docking interface connector and one is connected to the RS232 connector.

Important remark!
Only the RS232 connector is galvanic separated. The docking interface on the pump is a non galvanic isolated interface! Do not use the docking interface on the pump together with the interface cable (part 10.093) on a patient!

If the pump is intended to be monitored as a standalone pump on a patient, use the RS232 connector (RJ45, beside the drop detector connector). To use it, configure this connector as the default serial interface (refer index #55 in the configuration). If the pump is docked into a docking station ARGUS 60 M or ARGUS 100 M, the software switches automatically to the docking interface and the docking station builds the separation device (galvanic isolation) then.

3.2. Serial communication protocol

The following characteristics are basics for all the ARGUS devices (volumetric pumps, syringe pumps, docking stations with V4.xx and PCs) which are intended to communicate with the device mentioned in this service manual.

- Full-duplex RS232, currently 4800Baud for single pumps,
  9600 Baud for docking stations (also on master/slave-link).
- Simple master (host/PC) – slave (device) communication (host does polling).
- The host has to repeat the request if there is no valid response.
- Uses a checksum (CRC-8).
- Binary data transmission, thus no ASCII/text parsing.
- Fast & direct communication with pumps on ARGUS docking station.
- Specified timeouts during remote mode.
- Basic framing technique used as in the *Serial Infrared Link Access Protocol (Ir-LAP) Version 1.1*.

Please contact your local distributor or ARGUS Medical AG for the complete serial communication protocol description.

4. ARGUS *SERVICE*

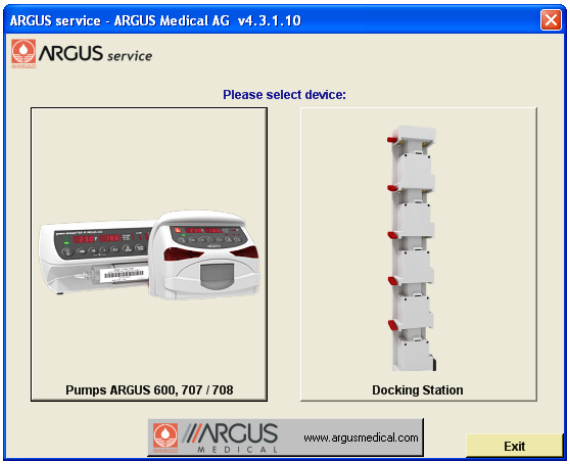
4.1. General

The new ARGUS *service* utility is a high and user friendly PC software which can configure and upgrade pumps over PC serial COM port. With this Windows based software you can also set pump clock, change PIN code, read and print out history and easily replicate pump configurations, and so on. The modern and clearly structured design of this self-describing PC-tool allows a very easy and rapid modification of the ARGUS 600 Syringe pump, the ARGUS 707 & 708 Volumetric pump and the ARGUS docking station. This software may be available from your local distributor or directly from ARGUS.

REMARK:
"ARGUS *service*" may only be used with software versions greater or equal to 4.00.

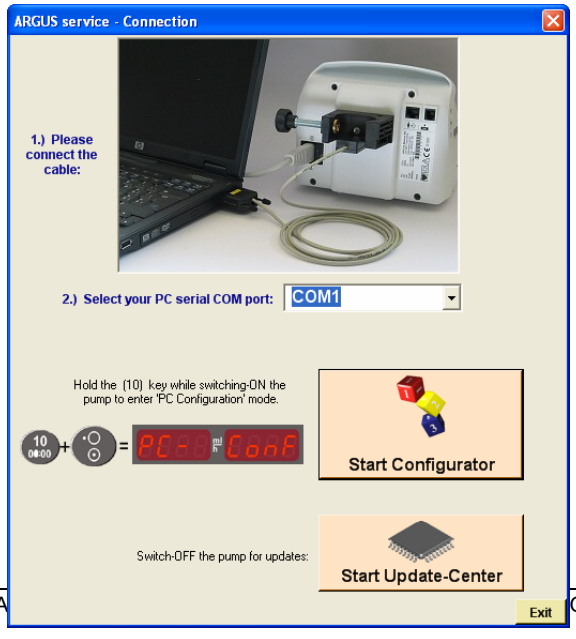
CAUTION!
The infusion pump has to be disconnected from the patient before and while the serial interface cable is connected to the pump.

The connection of the A707 over the serial interface RS-232 can be done by connecting the interface cable (*REF* 10.093) to the serial interface outlet of the serial PC-COM port.



Start the ARGUS *service*

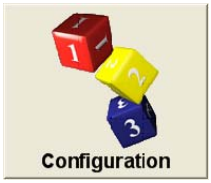
Press the button which confirm to your previously connected device (ARGUS pump or docking station).


ARGUS service - Connection
1.) Please connect the cable:
2.) Select your PC serial COM port:
COM1
Hold the (10) key while switching-ON the pump to enter 'PC Configuration' mode.
Start Configurator
Switch-OFF the pump for updates:
Start Update-Center
Exit

Hold the "10" key while switching-ON the pump.
Select "Start Configuration" (*see next chapter*) or "Start Update-Center" (*see chapter 5.3.2.*).

Select the next step by pressing one of the buttons (configuration, calibration or toolbox).

4.2. ARGUS *service* – Configuration



Important remark:
After configuration change, a function check and control measurement has to be done!

4.2.1. Configuration tree structure

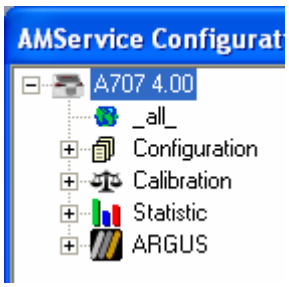
The configuration is split into 4 parts:

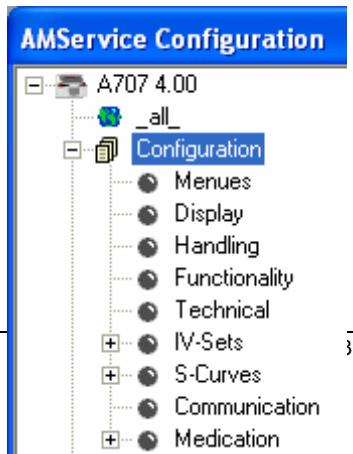
Configuration (part 1)
All configuration possibilities (indexes) mentioned in *chapter 2.7* can be modified herein in its own tree structure as shown below.
All indexes which are different from the pump firmware default are high lighted.

Calibration (part 2)
Details of the pump calibration can be read out of the pump.
The calibration cannot be modified herein.

Statistic (part 3)
Details about last used infusion parameters, total of infused volume and infusion time and so on are shown.
Also the last technical failure numbers are listed in this part.

ARGUS (part 4)
This part contains ex-works settings (e.g. pump serial number)





20, 22-30, 32-34, 369
1, 7, 8, 15, 16, 45, 46, 48, 56, 366
2-5, 14, 39, 49, 361, 365
11-13, 17, 38, 40-42, 60

390-394

348

6, 10, 18, 19, 43, 44, 47, 50, 51, 351, 362, 363, 368,

101, 310-318; 102, 320-328; 103, 330-338; 104, 340-

201-217; 221-237; 241-257; 261-277
55, 514-517
600-800, 561-592

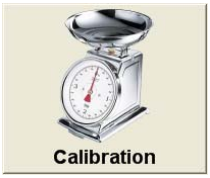
4.2.2. How to edit a configuration

The following procedure describes how to edit a pump configuration:

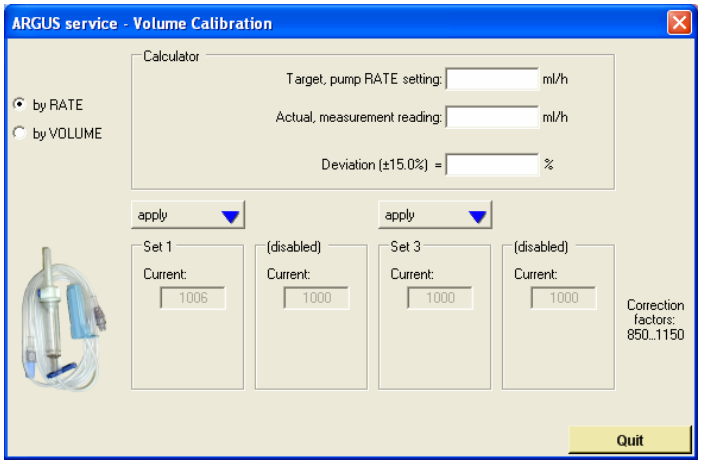
1. Press the green “Edit” button.
2. The software will ask for the pump PIN code as next. The button “Edit” changes its colour and will be renamed into “Download”.
3. If you want to import a configuration from a file press the “Import” button, otherwise skip this point.
4. Select “Configuration” in the structure tree in the left upper frame.
5. Select the index group you want to modify by selecting the according structure tree and the according index.
6. Modify the according index (within the given restrictions shown).
   Each value (number) must be acknowledged by the green “Enter” button.
   Go through point 5 & 6 for all further indexes you want to modify.
7. Press the “Download” button if you want to save the modified configuration on the pump. Otherwise you can save the modified configuration into a file by pressing the “Save” button.
8. **Make a functional check on each pump you have configured.**

Important remark!
If a config. has been edited (performed point 1 and 2) once do not switch off the pump! Otherwise the pump will change always into the PC-configuration mode automatically.

4.3. ARGUS *service* - Calibration (volumetric pums only)



Use this feature to easily calibrate the volume delivered by the volumetric pump.

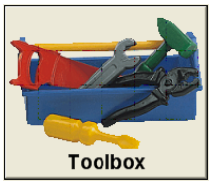


To do this, it is possible to enter the measured rate (of an infusion device tester e.g.) or from a measured volume (of a balance) to define a correction factor according *chapter 6.5.2.*

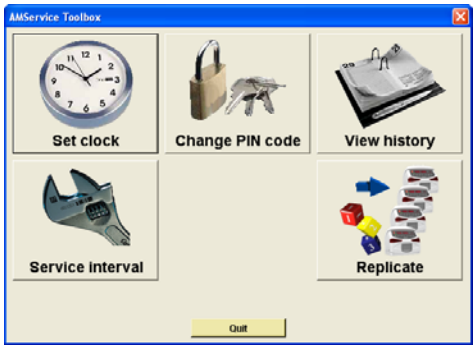
The calculated correction factor can be applied to IV-sets which are released in the config. (index #101 - 104) only. Please be sure which IV-set you want to calibrate before you press the “apply” button. Per ex-works settings, only IV-Set number 1 is calibrated.

Important remark!
It is mandatory to perform also a pressure calibration according *chapter 6.3.* if a new IV-set will be used.
We recommend to do a control measurement after changing the correction factor!

4.4. ARGUS *service* - Toolbox



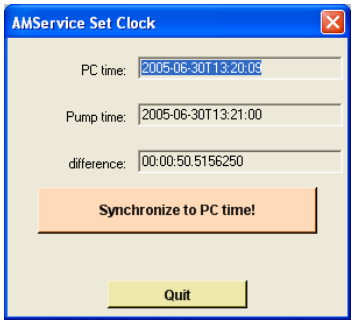
With the “ARGUS *service*” PC-tool you can set the pump clock, change PIN code, read and print out history, etc.



Select the next step by pressing one of the buttons (set clock, change PIN code, view history, service interval or replicate).

4.4.1. ARGUS *service* - Toolbox - Pump clock

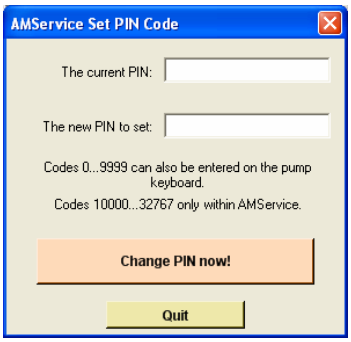
Use this feature to synchronize to pump internal clock with your PC time.



Please note: The pump internal clock will set to the central European time zone (Bern, CET, GMT +1.00h) as ex-works settings, the pump internal clock will not switch automatically between summer and winter time. All history logs (refer to *chapter 4.4.5*) will base on this time.

4.4.2. ARGUS *service* - Toolbox - PIN code

Use this feature to set the pump PIN code.


AMService Set PIN Code
The current PIN:
The new PIN to set:
Codes 0...9999 can also be entered on the pump keyboard.
Codes 10000...32767 only within AMService.
Change PIN now!
Quit

The setting of a PIN code prevents access to the pump configuration of third persons.
The default PIN code is “0” by ex-works settings.

Please note: The PIN code corresponds with the PIN code mentioned in *chapter 2.3.2*. If a PIN code greater than 9999 is entered, the pump configuration can only be accessed using the ARGUS *service* PC tool.

4.4.3. ARGUS *service* - Toolbox - Service interval

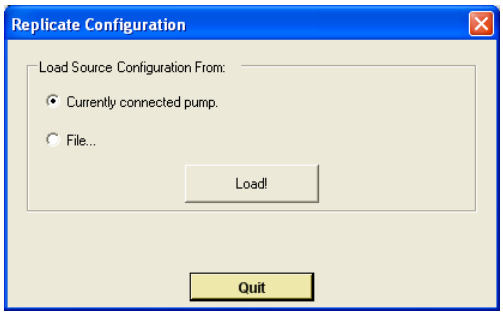
Use this feature to set a reminder alarm on the pump for the next service interval.
A pending reminder alarm will be shown on the pump display after power up by a flashing “CtrL” text accompanied by an acoustic sound.

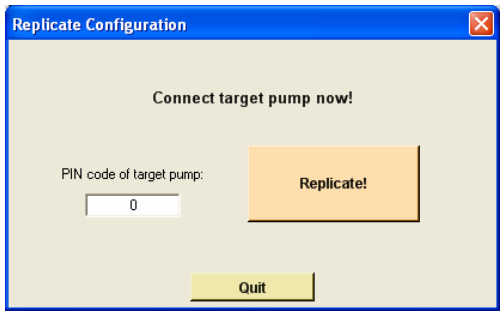
The point in time when an active reminder alarm occurs, is given by the settings of the configuration (#393 and #394) and the pump internal clock. Any value higher than 0 on those indexes will release the reminder alarm after the service interval has elapsed. Please check those settings first, before you set the reminder alarm!

Please note: By the ex-works settings, the reminder alarm is disabled.

4.4.4. ARGUS *service* - Toolbox - Replicate

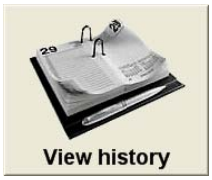
Use this feature to replicate fast and easily pump configuration from a saved configuration file or from a pump to another. A configuration can only be replicated if the saved configuration (and pump type) corresponds with the firmware of the connected pump in the first 2 digits (for e.g. 4.30 to 4.31 is possible).





Please note:
The pump internal clock and remainder alarm settings must be done individually on each pump!

4.4.5. ARGUS *service* - Toolbox - Pump history



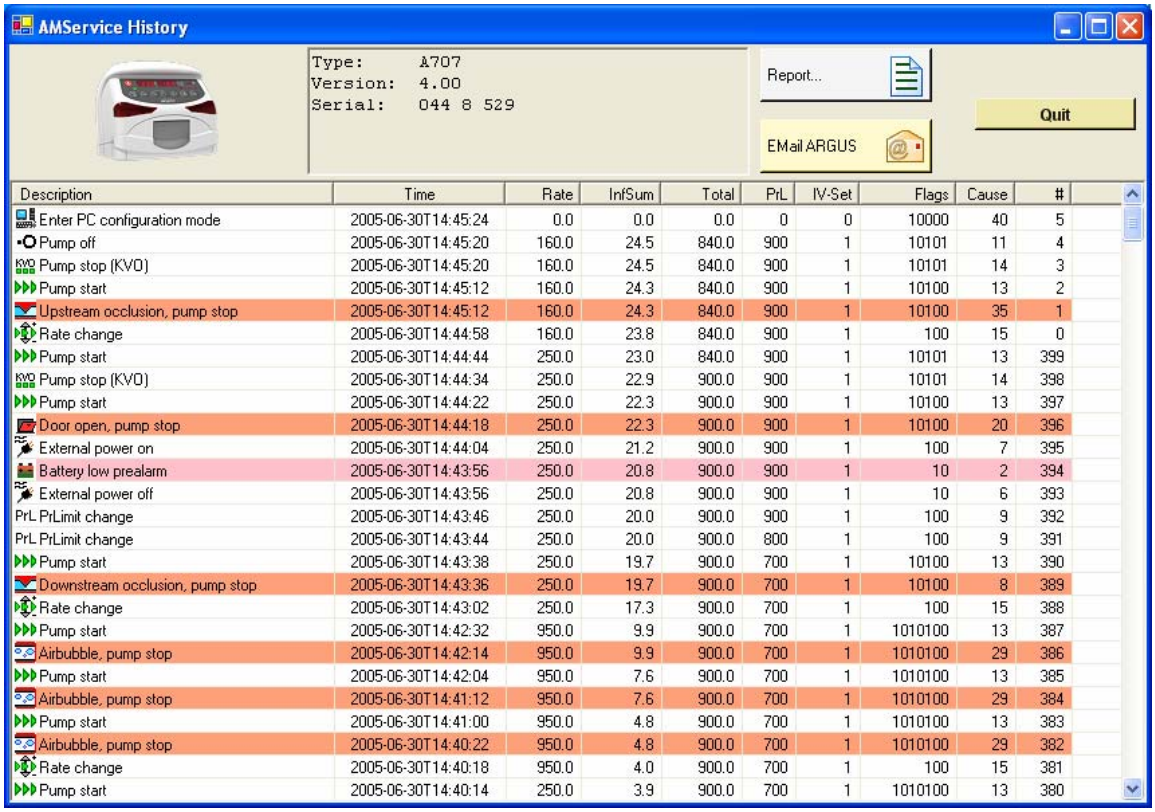
Each registered event has his own date & time stamp. An event is registered on each pump status change. Please refer to the complete list mentioned in *chapter 4.4.6* below.

4.4.6. History messages

Possible messages appearing in the description of each history event:

No information available	Pump start	Pump start in remote mode
Battery defective	Pump stop (KVO)	Rate change during remote mode
Battery low prealarm	Pump off	Pump off in remote mode
Battery low, pump stop	Pump on	Enter setup mode
Airbubble, pump stop	Transport off	Enter PC configuration mode
Door open, pump stop	Transport on	Exit setup or PC configuration mode
No drops, pump stop	Data lock off	Downstream occlusion, pump stop
Not enough drops, pump stop	Data lock on	Upstream occlusion, pump stop
Too many drops, pump stop	Rate change	Timer alarm, pump stop (KVO)
Neonatology mode set in PrL	Inf-Set change	PC communication timeout reached
PrLimit change	Infusm cleared	Logon in PC configuration mode
Bolus total reached	Bolus start	Logoff in PC configuration mode
Pump has detected failure	Bolus stop	Pump start, ext. changed parameters
Total volume reached, pump stop	External power on	Any defaults written in EEPROM area
Total (VTBI) change	External power off	CRC error in PC configuration module

4.4.7. History printout example



Description	Time	Rate	InfSum	Total	PrL	IV-Set	Flags	Cause	#
Enter PC configuration mode	2005-06-30T14:45:24	0.0	0.0	0.0	0	0	10000	40	5
Pump off	2005-06-30T14:45:20	160.0	24.5	840.0	900	1	10101	11	4
Pump stop (KVO)	2005-06-30T14:45:20	160.0	24.5	840.0	900	1	10101	14	3
Pump start	2005-06-30T14:45:12	160.0	24.3	840.0	900	1	10100	13	2
Upstream occlusion, pump stop	2005-06-30T14:45:12	160.0	24.3	840.0	900	1	10100	35	1
Rate change	2005-06-30T14:44:58	160.0	23.8	840.0	900	1	100	15	0
Pump start	2005-06-30T14:44:44	250.0	23.0	840.0	900	1	10101	13	399
Pump stop (KVO)	2005-06-30T14:44:34	250.0	22.9	900.0	900	1	10101	14	398
Pump start	2005-06-30T14:44:22	250.0	22.3	900.0	900	1	10100	13	397
Door open, pump stop	2005-06-30T14:44:18	250.0	22.3	900.0	900	1	10100	20	396
External power on	2005-06-30T14:44:04	250.0	21.2	900.0	900	1	100	7	395
Battery low prealarm	2005-06-30T14:43:56	250.0	20.8	900.0	900	1	10	2	394
External power off	2005-06-30T14:43:56	250.0	20.8	900.0	900	1	10	6	393
PrLimit change	2005-06-30T14:43:46	250.0	20.0	900.0	900	1	100	9	392
PrLimit change	2005-06-30T14:43:44	250.0	20.0	900.0	800	1	100	9	391
Pump start	2005-06-30T14:43:38	250.0	19.7	900.0	700	1	10100	13	390
Downstream occlusion, pump stop	2005-06-30T14:43:36	250.0	19.7	900.0	700	1	10100	8	389
Rate change	2005-06-30T14:43:02	250.0	17.3	900.0	700	1	100	15	388
Pump start	2005-06-30T14:42:32	950.0	9.9	900.0	700	1	1010100	13	387
Airbubble, pump stop	2005-06-30T14:42:14	950.0	9.9	900.0	700	1	1010100	29	386
Pump start	2005-06-30T14:42:04	950.0	7.6	900.0	700	1	1010100	13	385
Airbubble, pump stop	2005-06-30T14:41:12	950.0	7.6	900.0	700	1	1010100	29	384
Pump start	2005-06-30T14:41:00	950.0	4.8	900.0	700	1	1010100	13	383
Airbubble, pump stop	2005-06-30T14:40:22	950.0	4.8	900.0	700	1	1010100	29	382
Rate change	2005-06-30T14:40:18	950.0	4.0	900.0	700	1	100	15	381
Pump start	2005-06-30T14:40:14	250.0	3.9	900.0	700	1	1010100	13	380

All pre-alarms, alarms and technical failures are high lighted in a different colour.

5. SOFTWARE UPDATES

5.1. General

This chapter describes the procedure to perform a software update on the ARGUS 707 infusion pump. To check the installed software release in your ARGUS 707 V press the "MODE" key while switching on the pump.

Please refer to your local distributor or ARGUS Medical AG to determine the latest software release able to run on your device hardware.

5.2. Requirements for a software update

To update an ARGUS Medical device, the following items are needed:

- PC with Microsoft® Windows™ 2000 or newer, .NET Framework must be installed!
- RS-232 serial interface cable (part no. 10.093)
- PC configuration tool “ARGUS *service*”
- Latest firmware included in a text file named “A707_xxx.txt”. (“xxx” is the placeholder for the firmware version).

Those items are available from your local distributor or from ARGUS Medical AG.

5.3. Software update procedure

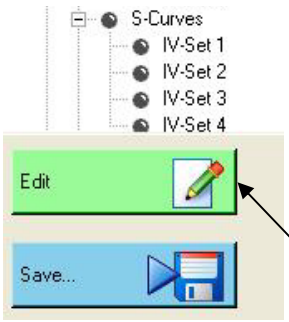
5.3.1. General

Please carefully check the software present installed on the pump. If you have a firmware < version 4.xx please follow *chapter 5.3.3* to upgrade the firmware.

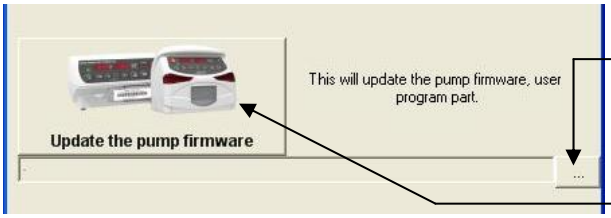
5.3.2. Update of a pump with firmware > V4.xx

Important remark!

The actual calibration (and configuration) will be stored in a file on the PC, please be sure you will restore the correct file into the pump after the firmware update. Otherwise invalid calibration values will be stored on the pump.



1. Connect the pump to the serial interface of your PC. Please remember the COM port number where you have connected the pump.
2. Switch the pump **ON** while keeping key [10] pressed.
3. Start the PC configuration tool “ARGUS *service*” and select the according COM port.
4. Go into the configuration part and save the present pump configuration (incl. calibration) to a file.
5. Close the “ARGUS *service*” and switch the pump **OFF**.
6. Perform point 3 again, go into the “Update center”.



7. Select the requested pump firmware file by pressing the button "…".
8. Press "Update the pump firmware". Follow the instructions displayed on the PC. The firmware will be installed and the pump will be switched off automatically.

9. Go into the configuration part again (refer to point 2-3). Press the "Edit" button and enter the pump PIN code (default PIN after firmware update is 0).
10. Restore the old configuration (incl. calibration) from the **previous** created file.
11. Restore the configuration by pressing the "Download" button.
12. Perform a standard safety check *(see chapter 10)*, normally the calibration will not be destroyed if the procedure is carefully performed step by step**.**

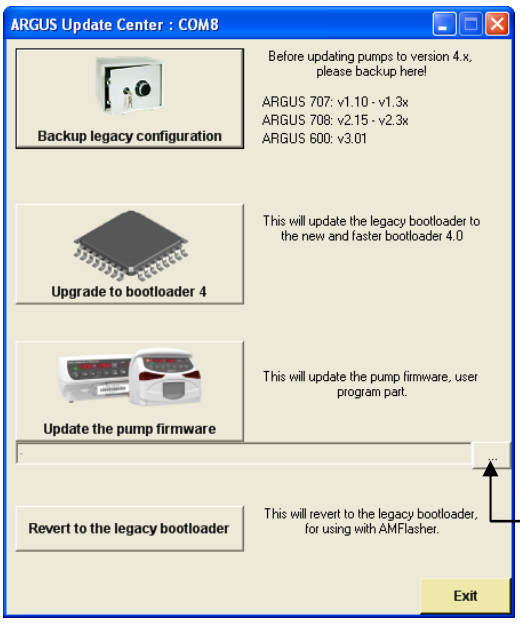
5.3.3. Upgrade of a pump with firmware < V4.xx

With the "Update center" it is also possible to upgrade pump firmware older than V4.xx.

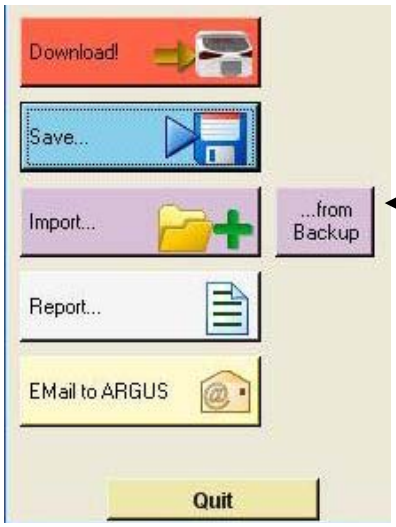
Important remark!

The actual calibration (and configuration) will be stored temporary on the PC, please perform the upgrade procedure pump by pump. Otherwise invalid calibration values will be stored on the pump.

It is urgent necessary to perform a standard safety check (*see chapter 10*)!


ARGUS Update Center : COM8
Backup legacy configuration
Before updating pumps to version 4.x, please backup here!
ARGUS 707: v1.10 - v1.3x
ARGUS 708: v2.15 - v2.3x
ARGUS 600: v3.01
Upgrade to bootloader 4
This will update the legacy bootloader to the new and faster bootloader 4.0
Update the pump firmware
This will update the pump firmware, user program part.
Revert to the legacy bootloader
This will revert to the legacy bootloader, for using with AMFlasher.
Exit

1. Go into the "Update center" (*see point 1-4 of chapter 5.3.2.*):
2. Switch the pump ON by keeping the key [10] pressed.
3. Backup the legacy configuration (present configuration before the firmware update). This may take several seconds.
4. Switch the pump OFF.
5. Press "Upgrade to bootloader 4". Follow the instructions displayed on the PC. The bootloader will be upgraded then.
6. Select the requested pump firmware file by pressing the button "…".
7. Press "Update the pump firmware". Follow the instructions displayed on the PC. The firmware will be installed and the pump will be switched off automatically.



8. Switch the pump ON while keeping key [10] pressed. Start the “ARGUS service” tool and select the according COM port.
9. Import configuration *from backup*. The calibration values and configuration of last connected pump will be imported.
10. Download it to the pump by pressing the “Download” button.
11. **Important:**
    Perform a standard safety check (*see chap.10*), the calibration values maybe lost during the upgrade procedure!

5.4. Safety aspects

Be aware of the following points:

! For medical device traceability your local distributor or ARGUS Medical AG needs to be informed about every device updates (serial number) you performed!

! Do not make any software updates when the device is used and/or connected to a patient!

CAUTION!
A standard safety check *(see chap.10)* has to be performed after every software update!

6. MAINTENANCE

6.1. General

CAUTION!
Only authorized persons who have been trained by ARGUS Medical AG or by the local distributor are allowed to service the ARGUS 707 V infusion pump. In case of repair request, send the unit with the filled out “repair order form” *(see chapter 11)* to the local distributor. Further information is available from:

ARGUS Medical AG
CH-3627 Heimberg / Switzerland
E-mail: info@argusmedical.com

CAUTION!
The safety standard check (SSC) has to be performed at least every 24 month or after 10'000 hrs of operation. The check has to be done in accordance to the *chapter 10*.
No special maintenance of the ARGUS 707 V infusion pump is necessary. There are no wear and tear parts.

6.2. Recalibration

6.2.1. General

Unless otherwise specified by the customer, the ARGUS 707 V has been calibrated by the manufacturer with the CODAN L86 PVC (*REF* 43.4304) infusion set. If a different infusion set is used *(see recommended list in the appendix of the user manual)*, a recalibration is required.

CAUTION!
A new set calibration always requires pressure sensors (up-/ downstream) and a volume calibration *(see chapter 6.3 & 6.5)*!

It is mandatory to execute first the calibration procedure of the pressure sensors and afterwards the volume calibration.

6.3. Pressure calibration

6.3.1. General

The volumetric infusion pump ARGUS 707 V contains two pressure sensors:
- One upstream sensor, bottle side (left input)
- One downstream sensor, patient side (right output).

A pressure calibration becomes necessary if:
- the pressure control measurement is not accurate enough
- a pressure sensor is replaced
- the main board is replaced or a new set is configured

Needed equipment:
- a manometer with a resolution of 0.1 bar
- a 3-way stop cock and a clamping shears
- the chosen IV set (refer to the list including the recommended IV set in the user manual)

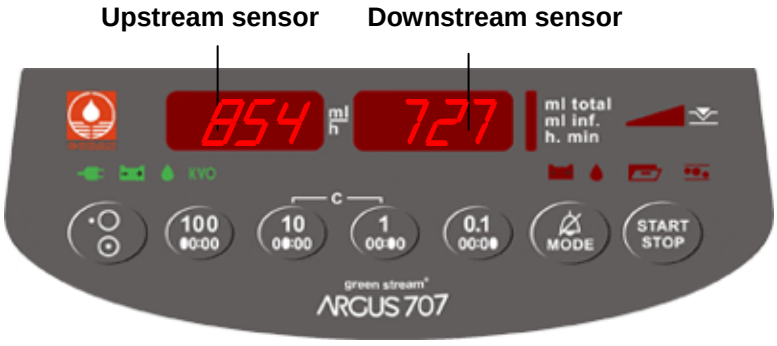
CAUTION! The pressure calibration procedure always includes all of the following steps, including a control measurement.

Key functions during pressure calibration:

By the "MODE" key you can switch to the next calibration step.

By the "START/STOP" key you can store the value of the involved pressure sensor, this will be acknowledged by a sound (beep).

By pressing the "1" key you can switch off and on the actual value of the pressure sensor in the display. The value is displayed in mV.



By pressing the "10" key you can switch off and on the motor.
Don't use it by the standard calibration.

By pressing the "100" key, the pump rate can be changed from 100 to 200 ml/h and back (toggle action).
It is recommended to reduce the rate when the pressure is near 1.2 (1.0) bar, this allows a more precise calibration.

6.3.2. Enter into the pressure calibration mode

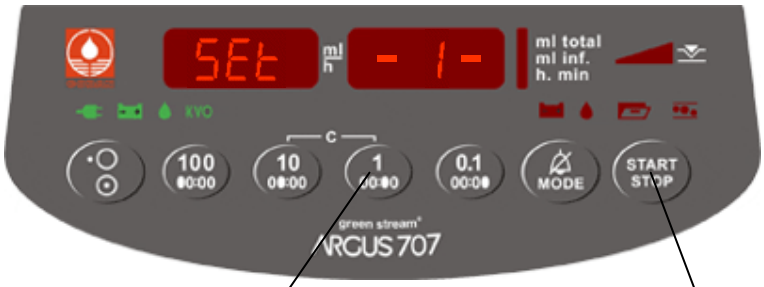
1. Enter into the configuration mode *(see chapter 2.3.).*

2. Select address 399 and press “MODE”.

3. Enter value 1234.

4. Press “START/STOP”. Display shows “Set - 1-”.

6.3.3. Set selection before calibrating



Before you select an IV set, check *chap. 2.8.*

1. Press key "1" to select the set number you want to calibrate (1 to 4).

2. Press “START/STOP”. Display shows “CAL. door”.

6.3.4. Calibrating the offset of both sensors

1. Remove the IV set and open the door.

2. Press “START/STOP” to store the values for the up- and downstream sensor.

3. Press “MODE”. Display shows “CAL 1.0b”.

6.3.5. Calibrating the downstream sensor

1. Take a new IV set filled with water.
2. Simulate a downstream occlusion by the 3-way stop cock before you insert the set.
3. Open the roller clamp, insert the new IV set and close the door.
4. The pump generates a pressure build-up automatically.
   When the pressure 1.0 bar reaches press "START/STOP".
5. Release the pressure and press "MODE".
   Display shows "uPSt rEAM".

6.3.6. Calibrating the upstream sensor part 1

1. Install a clamping shears near the pump (bottle side) and wait 15 sec, then press "START/STOP". *
2. Release the clamping shears and press "MODE".
   Display shows "CAL 0.2b".

* **Remark:** By pressing key "1" the pressure signal in (mV) of the upstream sensor will be displayed, after approximately 15 seconds the value does not decrease that fast any more; at this point press "START/STOP" to store the value (refer to step 1). The software will not allow the value to drop lower than the previous saved door open offset value +50mV.

6.3.7. Calibrating the downstream sensor

"CAL 0.2b"

1. Simulate a downstream occlusion by the 3-way stop cock.

2. The pump generates a pressure build-up automatically.
   When the pressure 0.2 bar reaches press "START/STOP".

3. Press "MODE".
   Display shows "CAL 1.2b".

"CAL 1.2b"

4. The pump continues on with the pressure build-up.
   When the pressure 1.2 bar reaches press "START/STOP".

5. Release the pressure and press "MODE". Display shows "CAL -1.0b".

6. Close the roller clamp and open the door. The pump pumps reverse.

Remark: The pump must reach a pressure of at least 1.2 bar. Otherwise there might be a mechanical problem (Check the pump unit and the door).

6.3.8. Calibrating the upstream sensor part 2

“CAL -1.0b”

1. Simulate an upstream occlusion by the 3-way stop cock.
2. Open the roller clamp, insert the IV set in the reverse direction and close the door.
3. The pump generate a pressure build-up automatically.
   When the pressure 1.0 bar reaches press “START/STOP”.
4. Release the pressure and press "MODE". Display shows “CAL -0.2b”.

“CAL -0.2b”

5. Simulate an upstream occlusion by the 3-way stop cock.
6. The pump generates a pressure build-up automatically. Is the pressure of 0.2 bar reached press “START/STOP”.
7. Press "MODE".
   Display shows “CAL -1.2b”.

“CAL -1.2b”

8. The pump continues on with the pressure build-up. When the pressure 1.2 bar reaches press “START/STOP”.
9. Release the pressure and press "MODE". Display shows “SEt - 1-”.
10. Switch the pump off. Close the roller clamp and remove the IV set.
11. Perform a control measurement according *chapter 6.4.*

6.4. Pressure control measurement

6.4.1. Downstream control measurement

1. Insert the IV set and close the door. Open the roller clamp.

2. Switch on the pump and set the infusion rate at 200 ml/h. Start the infusion. After 10 seconds you have to simulate a downstream occlusion.

3. At 700 mbar the pump must stop and release an alarm. The tolerance is +150/-50 mbar.

Remark:
A pressure limit of 700 mbar must not be the default value in menu “PrL” (configurable), please select 700 mbar as default for this control measurement.

If the result of this control measurement does not fulfil the stated requirement, a pressure calibration according to *chapter "Pressure calibration"* has to be carried out again.

6.4.2. Upstream control measurement

Start an infusion at a rate of 200 ml/h according the user manual.

Simulate an upstream occlusion by installing a clamping shears *(see chapter 6.3.6*) or by kinking the tube. To avoid the drop alarm release, simulate falling drops on the drop detector.

The pump must stop after several seconds and an upstream alarm (right hand LED in the pressure bar graph) must be activated.

If the result of this control measurement does not fulfil the stated requirement, a pressure calibration according to *chapter "Pressure calibration"* has to be carried out again.

6.5. Volume calibration

6.5.1. General

On the A707 Volumetric pump it is possible to calibrate up to 4 different IV-Sets. For each IV-set you can define a correction factor, which calibrate the volume delivered.

There are two ways to calibrate the volume delivered by the ARGUS 707 Volumetric pump, select one:

- By entering the correction factor
- With the internal calibration program of the pump

Needed equipment: balance with a resolution of 0,1g at least

6.5.2. Volume calibration of the pump by defining the correction factor

Please be sure, which IV-set you want to calibrate. If it is not enabled in the configuration, please enable it first and select the according IV-set in the normal mode of the pump in menu “Set -x-“.

1. Insert a new IV set (only recommended IV sets may be used, see appendix in the user manual) in the pump and perform a “warm up” infusion of 40 ml at an infusion rate of 999.9 m/h!
2. Infuse now a volume of 30 ml of water in a measuring cup on a zeroed balance at an infusion rate of 250 ml/h.
3. Determine the weight of the delivered water.
4. Connect the pump to a PC and start the ARGUS *service* PC tool as described in *chapter 4*, go into the calibration part of this tool.
5. Refer to *chapter 4.3*, select “by VOLUME” on the left side in the calibration window.
6. Enter 30 in the target volume setting field, enter the measured volume (weight) in the “actual measurement reading” field. The deviation will be calculated by the PC software.
7. Apply this value to the IV-Set you want to calibrate.
8. Perform a control measurement according to the steps 2 & 3 above. Repeat the calibration procedure if necessary.

6.5.3. Volume calibration of set 1 with the pump integrated calibration program

Needed equipment: balance with a resolution of 0,1g at least

1. Insert a new IV set (only recommended IV sets may be used, see appendix in the user manual) in the pump (filled with water) and connect the infusion line to a measuring cup on a balance.
2. Enter into the configuration mode as described in *chapter 2.3.*
3. Enter at address 399 the value "123". Press key “START” to acknowledge the entered value. Now you can select your preferred set (in our case set 1).
4. Press the key “START/STOP”. The pump delivers a volume of 40 ml at an infusion rate of 999.9 ml/h (“tArA” is flashing).
5. When “tArA” stops flashing, reset the balance to “0”.
6. Press the key “START/STOP”. The pump will display “tM 432” (infusion delivery time is 432 seconds). It should now deliver a volume of 30 ml at an infusion rate of 250 ml/h.
7. After the delivery time has elapsed, the pump stops and shows “bAL.” “30.00” in the displays.
   Enter now the value of the balance, e.g. 29.80g. This value must be within the range of 25.50 – 34.50. Otherwise switch the pump off and restart the volume calibration.
8. Press the key “START/STOP” to acknowledge the entered value.
9. The pump displays the new correction factor, e.g. “Cor.” ”993”.
10. Press the key “START/STOP” to store the new correction factor acknowledged by a buzzer sound. The pump display changes back to “SEt” “-1-“ again.
11. Switch the pump off. **Do not remove the infusion set!**
12. Perform a control measurement with an infusion rate of 250 ml/h and an infusion total of 30 ml. Repeat the calibration procedure if necessary.

For an optimized long time accuracy over 24 hours, we recommend to do a control measurement over 24 hours on a rate of 25 ml/h.

6.6. Pump specifications

Please refer to the user manual for the specifications (*chapter 9*).

6.7. Fault codes

A technical failure will be signalled by the pump with a continuous alarm display and a continuous sound. During this state, the fault code which causes the pump to fail can be displayed by pressing the key “MODE”.
If the pump was switched OFF after a detected failure, the fault code will be stored in the configuration of the pump (see index 380 - 389 via ARGUS *service* PC-tool).
The possible fault codes registered in the configuration are listed in the table below:

Fault Code	Failure
F_21	ROM test
F_22	ROM check (Runtime)
F_23	RAM test/check
F_24	XRAM test/check
F_25	CPU test
F_26	Invalid function menu
F_27	EEPROM data invalid
F_28	RTC data invalid, no RTC etc.
F_29	Stepper motor power test (delayed 5s)
F_32	5Volt supply out of range
F_33	24Volt supply out of range (delayed 5s)
F_37	Downstream pressure sensor test failed (always > 4.7V or < 0.2V, delayed 5s)
F_38	Upstream pressure sensor test failed (always > 4.7V or < 0.2V, delayed 5s) *
F_39	Downstream pressure sensor test failed (dynamical test failed)
F_40	Upstream pressure sensor test failed (dynamical test failed) *
F_44	Address invalid for config-eeprom
F_45	Address invalid for history-eeprom
F_46	Frequency from uC or RTC out of range
F_47	Display-print not present
F_48	Key(s) too long active
F_49	Sensor-print not present
F_50	AIL (Air in line) detector test failed
F_51	Movement test failed (Home-Pulse < (Hall / Home))
F_52**	Movement test failed (Home-Pulse > (Hall / Home))
F_53	More than one rotation at 'STOP' without 'KVO'
F_54	Infused sum <> Calculated sum (Rotations)
F_55	Frequency calculation
F_56	Invalid volume adjustment over time
F_57	Rotation (SW overflow)
F_58	Internal volume control (10/ml)

We recommend replacing the main board in case a fault code is not included in this list above.

* Failure released only if configured with upstream sensor (index 51=Yes).

** Fault code F_52 may occur after a software update or if peristaltic is manually turned during service. In this case, turn the pump off then on again and restart the pump. If a failure free start can be performed, omit this fault code.

7. REPLACEMENT OF PARTS

7.1. General

CAUTION!
The ARGUS 707 V may only be used with accessories and spare parts which have been approved by ARGUS Medical AG for safe technical use.

CAUTION!
If a door, a housing, a pressure sensor or a main board is replaced, a full calibration (pressure sensors and volume calibration) is required.

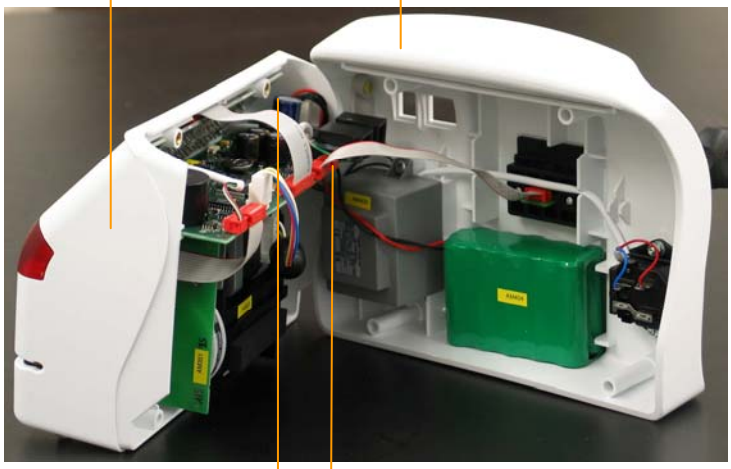
7.2. Disassembling of the ARGUS 707 V

CAUTION!
Disconnect the mains cable from the power outlet before opening the housing! Observe the antistatic protection rules when disassembling the ARGUS 707 V (the use of an antistatic table mat and a grounded clip are recommended).

7.2.1. Disassembly of the case

1. Remove the four screws on the back side.

2. Separate the front and the back side.



3. Disconnect the battery, the supply and the docking interface connection.

7.2.2. Removing the pump door

1. Gently press this hinge stopper backwards.

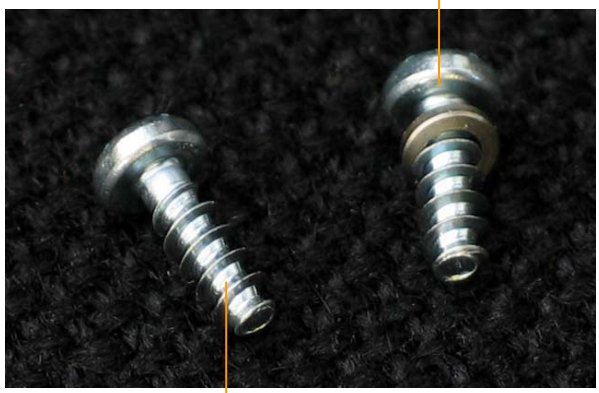
2. Pull the shaft towards the centre. Repeat point 1 and 2 for the other side of the door and then remove the door.

7.2.3. Disassembling the pump unit

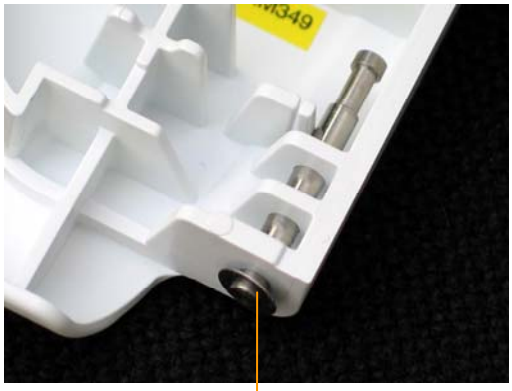
1. Unscrew these screws. Remove the pump unit.

7.2.4. Assembling the pump

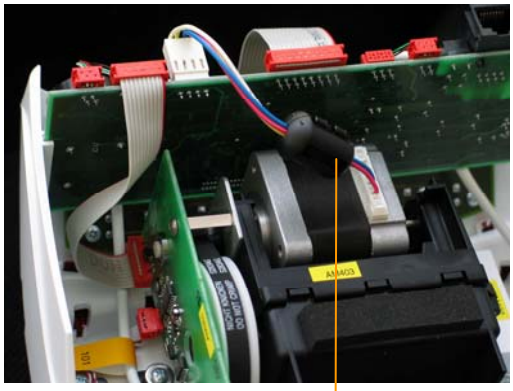
1. Use the screw with two washers at these places (torque 1.0 Nm)!



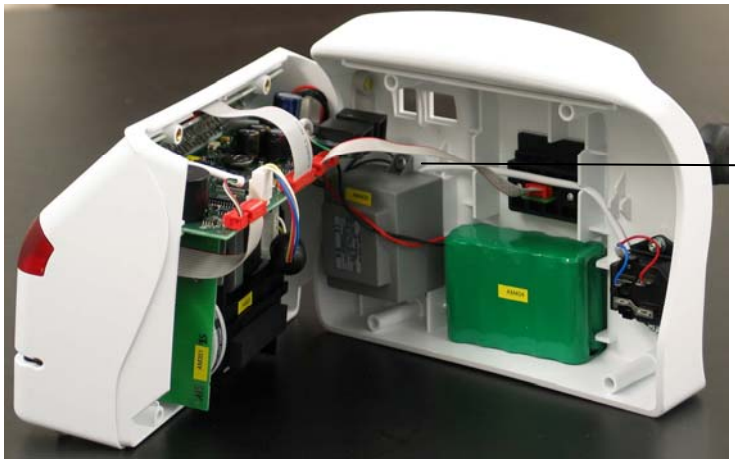
2. Use the screw without a washer at these places (torque 1.0 Nm)!



3. Reinstall the door. Make sure that a washer has been installed on each side!

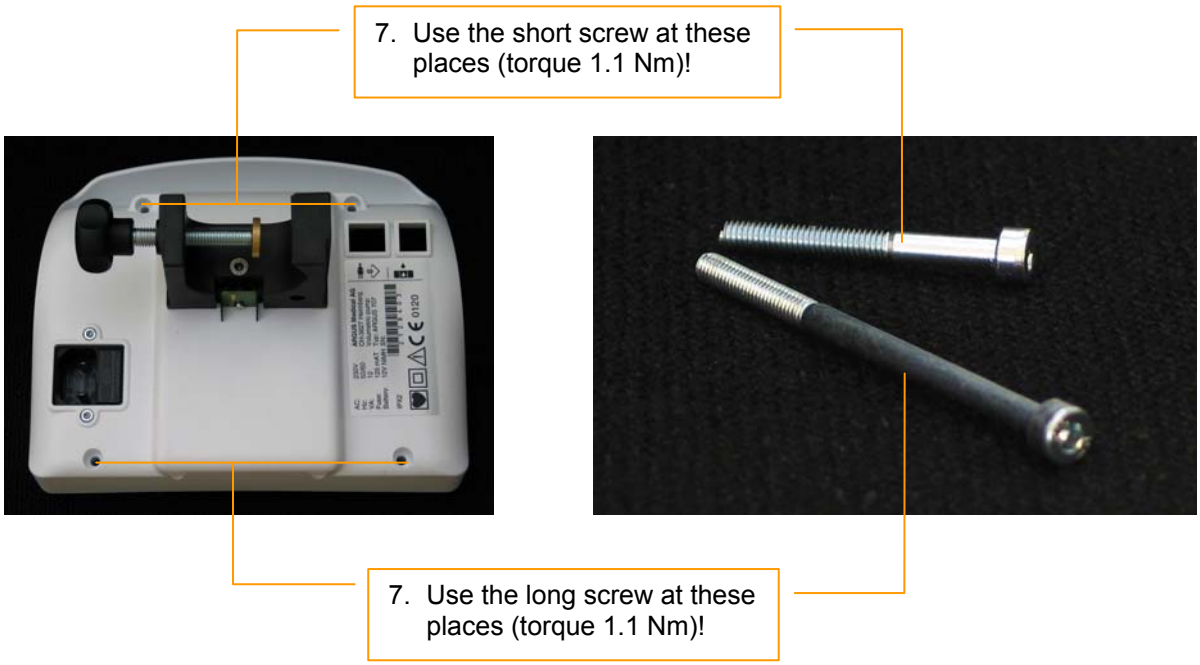


4. Make sure that this part touches nowhere, otherwise noises may be generated!



5. Reconnect the back side with the front side (battery, power & docking interface)!

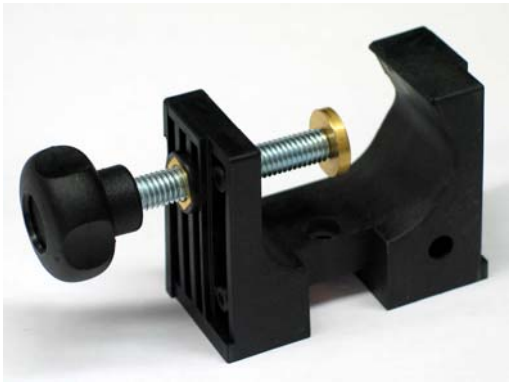
6. Make sure that both cables are correctly placed in the notch before the main board is inserted!



Mind the torque for the screws listed below:

What:	Where	Torque in Nm
Case	Backplane into front	1.10
Pump unit	Into front	1.00
Combination clamp	Into clamp holder	1.50
Pressure sensor	Into front	0.60
Stop flow	Into front	0.60
Air detector	Into front	0.60
Sensor board	Into pump unit	0.40
Display board	Into front	0.50
Transformer	Into Backplane	1.00
Clamp holder	Into Backplane	0.50
Mains plug	Into Backplane	0.50
Edge board	Into clamp holder	0.50

7.3. Spare parts

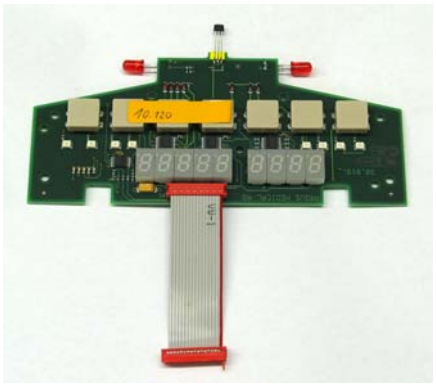


10.087 Combination clamp

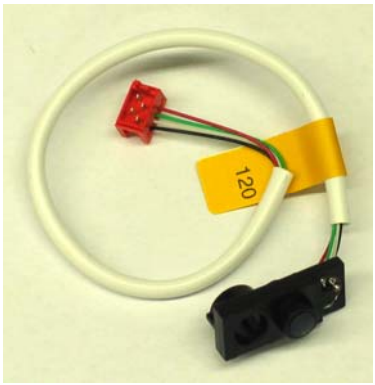
10.089 External drop detector

10.093 Interface cable docking pumps

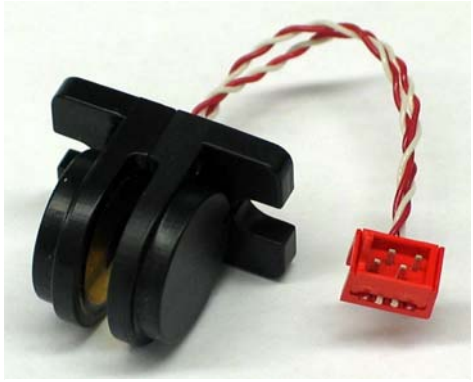
10.119 Battery NiMH 12V/1500mAh



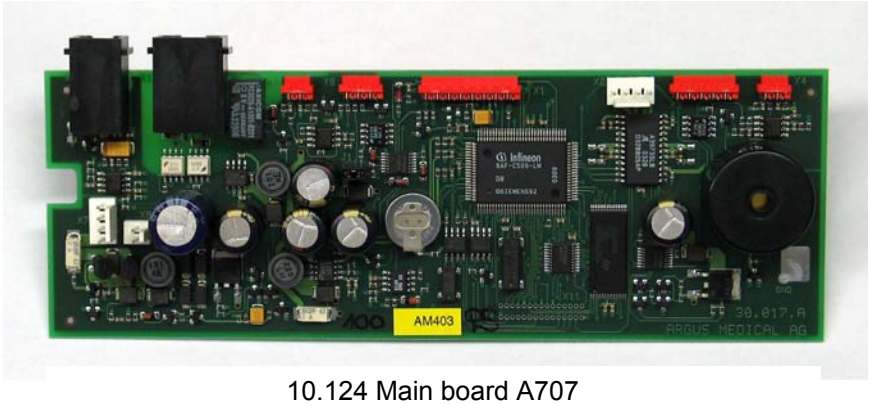
10.120 Display board A707



10.121 Pressure sensor

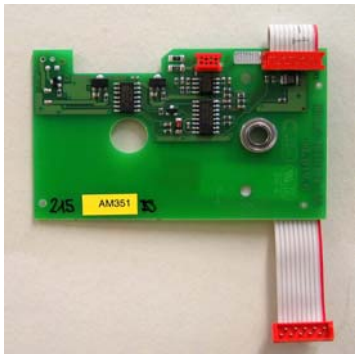


10.122 Air detector



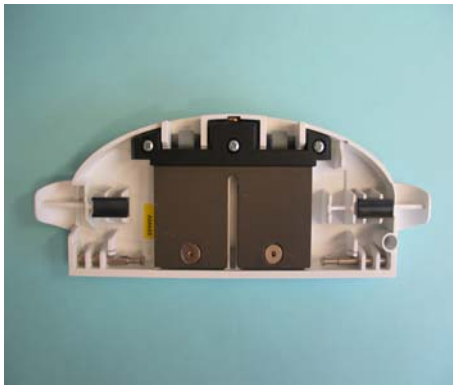
10.124 Main board A707

10.123 Stop flow A707

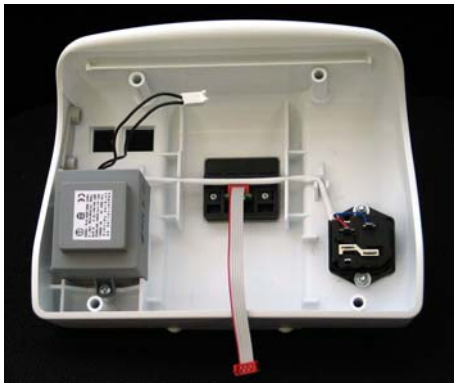


10.125 Sensor board A707

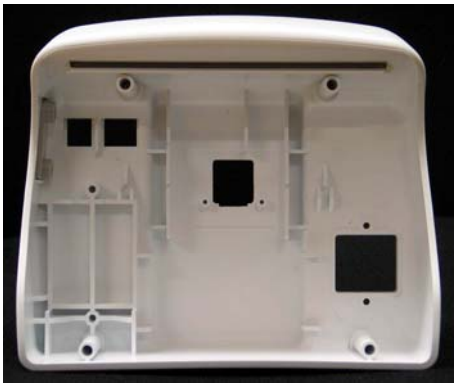
10.126 Pump unit A707



10.127 Door complete A707



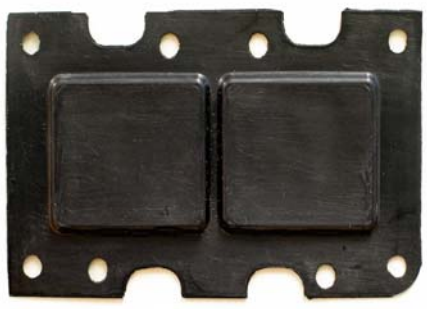
10.128 Casing back plane A707 30VAC complete



10.136 Casing back plane A707

10.129 Casing forepart (without door) complete

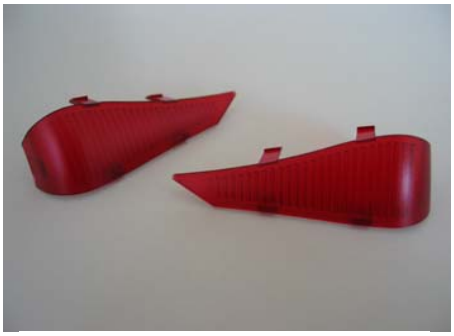
10.137 Casing forepart



11.221 Sealing A707

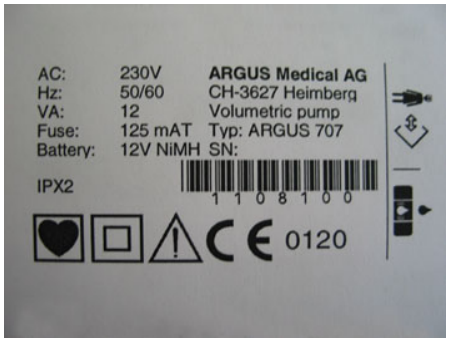
12.042 Cable staff alert 2m

12.011 Interface cable 8pol/2m & 12.012 Interface adapter

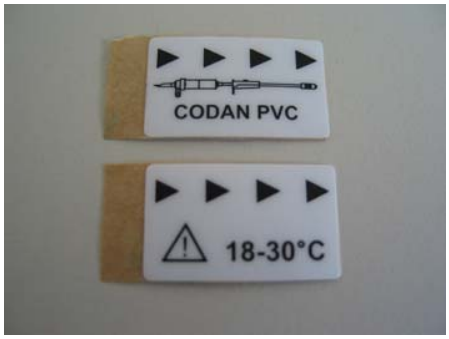


11.268 Alarm lights

11.132 Label external drop detector



11.237 Identification plate A707



11.238 Label flow direction

10.135 Edge board complete A707

Part no. 11.222 Front panel A707

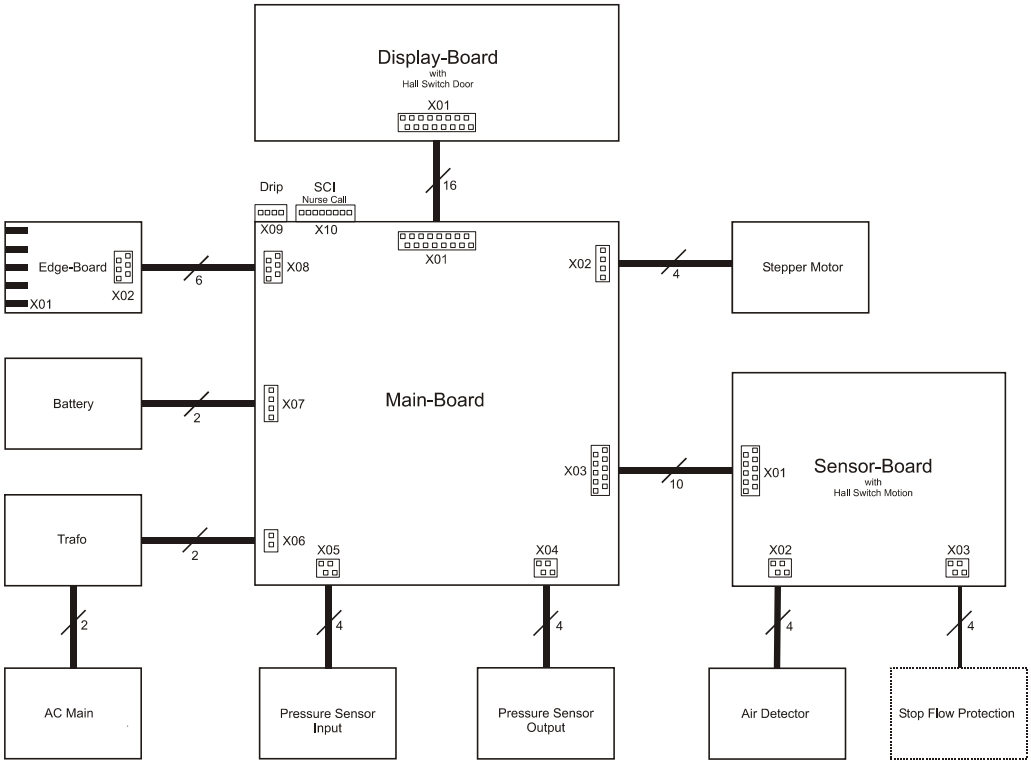
12.035 Pressure gauge
with stopcock

11.219 + 11.239 – 11.247
Short instructions
(SW, DE, EN, FR, DK, NL, CZ, PT, SP, IT)

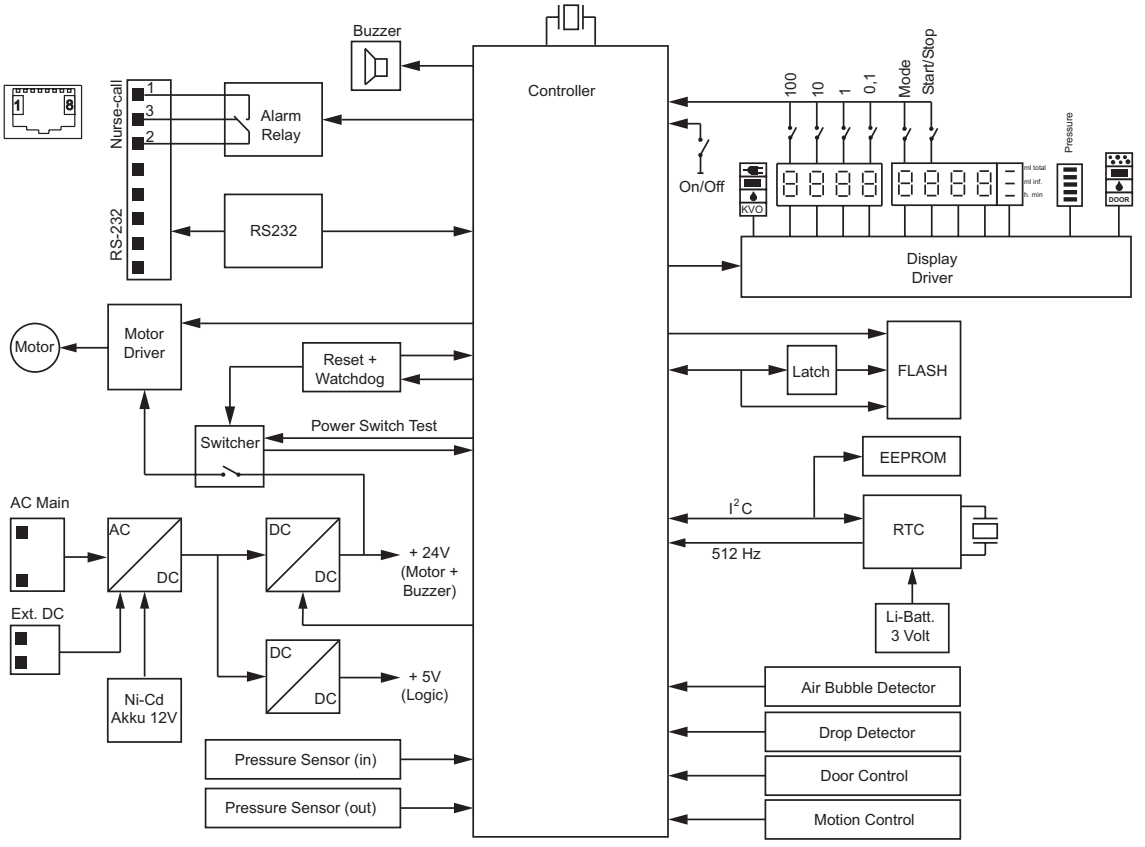
11.005 Bottle holder 45 cm
11.043 Bottle holder 60 cm

12.044 Plug

8. WIRING DIAGRAMM



9. BLOC SCHEMATIC



10. SAFETY STANDARD CHECK

Safety Standard Check (SSC) ARGUS 707 V_en

Serial-no.: ……...…….....	Inventory-no.: ……..…….....
Hospital: ……	Department: …….....
Customer: ……	

The SSC has to be performed at least every 24 months or after 10'000 hours of operation.
The check has to be done in accordance to the user- and service manuals.

1	Check if a software upgrade is required?		
2	Visual check for damage, cleanness and completeness	- Housing, labels, accessories, connectors, power cable, etc.	
3	Test the function of the stop flow clamp	- Proper movement of the clamp	
4	Keep "MODE" pressed while switching on the pump	- Display pump type and software release - Display of 2, 4, 7, F., in numeric display - Display of all operation- and alarm indicators	
5	Connect/disconnect the pump to the mains	- The indicator “external supply” turns on/off	
6	Test the drop detector by simulating drops	- Check the green “drop” indicator	
7	Test the door switch, open and close the door	- Door open the “door” indicator lights up - Door close the “door” indicator turns off	
8	Open the door and remove any IV set	- Indicator “air bubble” lights up	
9	Install a water filled IV set, close the door	- Indicator “air bubble” turns off	
10	Set rate to 333.3 ml/h, press "START", disconnect the drop detector	- The red indicator “drop” lights up (delayed) - The acoustical alarm turns on	
11	Press "MODE"	- The acoustical alarm mutes	
12	Check the external connector “nurse call”	- Relay contact switches (see *chapter 9*)	
13	Calibration of the pressure sensors IV set type used: Codan ……..……. Other ……	- See *chapter 6.3.* and *6.4.* of the service manual	
14	Volume calibration	- See *chapter 6.5.* of the service manual	
15	Charge the battery while the pump is running 16 hours, at a rate of 30.0 ml/h	- The indicator “external supply” must light	
16	Battery check at a rate of 30 ml/h. Run the battery test until the pump switches off automatically	- The green indicator "battery" lights up during this test	
17	Printout the pump history (refer to *chapter 4.4.5.*)	- Check the pump internal time and data - Check the battery run time by checking the latest history entries, > 4h 30min	
18	Electrical test according to EN60601-1 (all measurements made with a power cable 2.5m)	- Visual check of mains connector - Measurements attached	
19	Charge the battery after this test!		

The pump has passed the SSC and is safe for use

Date / Name: ……..……..	Signature: ……..…….

ARGUS Medical AG

11. REPAIR ORDER FORM

ARGUS Medical AG / Heimberg Switzerland
REPAIR ORDER FORM

Purchase order / Proforma invoice number:

Customer name and address:

Name of contact person: Tel. number:

Device:

A414	☐	ARGUS 100 P	☐
A400	☐	ARGUS 100 M	☐
A404	☐	ARGUS 600 S	☐
A200	☐	ARGUS 707 V	☐
A300	☐	ARGUS 708 V	☐

Serial Number:

Accessory: Serial Number / Production code:

Detailed failure or problem description:

Expected work / repair to be done:

Repair ☐
Warranty repair ☐
Replacement ☐

Other ☐ Description:

Date: Signature: